TECHNE

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TECHNE

Calibration Products for the Industrial Laboratory

Bibby Scientific

Contents

i **Introduction**
1 Bibby Scientific
1 **Tecal Series of Portable Dri-Block® Temperature Calibrators**
2 Tecal Introduction
3 Tecal 140F
4 Tecal 425F
5 Tecal 650F
6 Tecal 140S/H
7 Tecal 425S/H
8 Tecal 650S/H
9 Tecal 140 F,S and H / 425 F,S and H Inserts
10 Tecal 700X
11 Tecal 1200S
12 TechneWorks
13 User Probe Interface (UPI)
14 Dri-Block® Calibrator Model CE-350
15 Accu-Temp RTD thermometer
16 Tecal Accu-Temp II
18 RTD 660°C probes
19 RTD 350°C probes
20 CH-5 Chiller Unit
21 **Liquid Temperature Calibration Baths**
22 Liquid Temperature Calibration Baths Introduction
23 Unheated Baths
24 Thermoregulators
26 Dip and Flow coolers
27 Refrigerated Baths
26 Liquid Calibration Baths Choice of liquids
27 Liquid bath accessories
28 High temperature bath fluid
30 Low temperature bath fluid
35 **Precision Temperature Fluidised Sand Baths**
36 **Fluidised Sand Baths**
37 SBL Introduction & SBL-1
38 SBL-2, 2D and TC-8D
38 FB-08 Range Introduction
40 FB-08
41 FB-08LT
42 FB-08C
43 FB-08C
43 FB-08 Accessories
45 SBL Accessories
46 BFS High temperature calibration bath
47 RCB-80,Ultra low temperature Liquid bath
49 **Handheld Thermometers**
50 4500 High Accuracy Thermometers
51 4500 Smart probes

One established name...

Bibby Scientific

One of the largest broad based manufacturers of labroatory products worldwide, Bibby Scientific provides internationally recognised brands with reputations for product quality and high performance. These famous brands are now brought together in a single package to offer an uncomparbale level of quality, service and support.

...three recognised brands,

stuart®

- The extensive **Stuart®** range includes block heaters, blood tube rotators, colony counters, hotplates, hybridisation ovens, rockers, shakers, stirrers and water baths.

TECHNE

- **Techne®** is a world leader in the manufacture of temperature controlled equipment from DNA testing with our Thermal cyclers and Hybridisation ovens to Laboratory equipment such as our Water baths and Dri-Block heaters. Techne also manufacture Industrial Fluidised Baths to remove residues from plastic mould tooling in the industrial sector through to precision Fluidised Calibration baths and Dri-Block calibrators.

JENWAY

- **Jenway®** makes a wide range of scientific instruments including UV/Vis spectrophotometers, flame photometers, colorimeters, portable and laboratory meters for the measurement of dissolved oxygen, pH, conductivity and specific ions.

...the same level of quality, service and support

Introducing the Techne Calibration Range...

Dri-Block Temperature Calibrators

The Tecal Block Calibrator series are used as portable temperature calibrators in a wide variety of industries for checking the calibration of thermocouples, RTDs and liquid filled sensors. The checking of temperature is vital in numerous industrial processes – engines, machines, boilers, pumps, storage rooms, air conditioners, compressors used in power stations, chemical plants, refineries, offshore platforms, ships, steel works, instrument companies are all typical application areas.

Water Baths

A comprehensive range of temperature controlled water baths are available from Techne. Twenty different water bath combinations allow the use of accurate temperatures from -40°C up to 250°C; ensuring a solution for most laboratory applications.

Precision Temperature Fluidised Sand Baths

With more than 50 years experience in the field of temperature control, Techne has established itself as a world leader in the design and manufacture of equipment used for both laboratory and on-site temperature calibration, providing the calibration engineer with a precise dynamic stable temperature source.

Exceptional temperature stability and uniformity also make Techne fluidised baths the ideal choice for critical heat treatment procedures. Pioneers in the development of fluidised bath technology, Techne have a wide range of products capable of covering the temperature range –100°C to 1100°C.

Techne fluidised baths are used in materials and component quality control, instrument calibration laboratories and thermal processing production departments. They provide rapid heat transfer and precise temperature control to calibrate and maintain temperature sensitive instruments efficiently and safely.

Handheld Thermometers

The Model 4500 Series Ultra-High Accuracy Thermometer take metrology-level temperature measurement to the laboratory, the production floor and the field.

Ultra-high system accuracy is achieved because the thermometer and probe function as if they were calibrated together as a system even though they can be purchased separately. The 4500 System uses coefficients stored in each probe with the Steinhart-Hart algorithm to calculate the exact temperature reading every time you plug in a probe to take a measurement.

The 4500 series thermometers accept a wide range of plug-in probes equipped with proprietary Smart Probe system. The probes utilize super stable thermistors capable of providing high resolution, fast response and ultra high accuracy.

How to find us...

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Tecal Portable Dri-Block® Calibrators

Tecal Series of Dri-Block® Calibrators

The Tecal Block Calibrator series are used as portable temperature calibrators in a wide variety of industries for checking the calibration of thermocouples, RTDs and liquid filled sensors.

The checking of temperature is vital in many industrial processes – engines, machines, boilers, pumps, storage rooms, air conditioners and compressors used in power stations, chemical plants, refineries, off-shore platforms, ships, steel works and instrument companies which are all typical applications for uses of this type of equipment.

The Tecal series comes in three different models offering from simple, reliable and portable temperature calibration and also for applications where greater flexibility is required.
The Tecal 'F' units are lightweight portable units in 2 versions with or without RS-232.
The Tecal 'S' units are designed for Laboratory use and include RS-232.
The Tecal 'H' units have programming facilities with a switch test function and RS-232.

With the Tecal 'S' and 'F' models calibration is simple, quick and easy.

1. Select the temperature scale required (°C or °F) and calibration temperature on the LED display.
2. Place the insert into the hole in the block.
3. Place the sensor under test into the insert.
4. Connect the sensor to reading device (DVM, Digital Thermometer or sensor controlling circuit etc.)
5. Allow the block to stabilise for at least 10 minutes once it has reached the desired temperature.
6. Compare the temperature reading of the external thermometer with the reading on the Tecal LED display.
7. Repeat the above steps for all calibration temperatures until the calibration is complete.

The Tecal 'H' range allows greater flexibility where several calibration programs may need to be carried out in the field.

1. The 'H' range is fitted with a 4 line by 20 character LCD and an 8 button keypad for creating and using calibration programs (setting temperature, ramp rate and holding time) and storing data at each temperature.
2. The LCD and keypad allow the user to configure the calibrator for:

- A normal calibration of temperature probes (analogous to the 'S' range).
- A switch test input for monitoring hydraulic thermostats, including the ability to pause at the temperature where switching occurs (very useful when the temperature for switch changeover is not known).
- A calibration using the User Probe Interface (UPI), (see page 12) which allows storage of both the block temperature and the reading of the test sensor which is connected to the UPI.
- The Tecal 'H', 'S' and selected Tecal 'F' models have an RS-232 interface for data and program transfer or real time control using Techne Works (see page 11).

The 'S' and 'F' models require the computer to be continuously connected to the Tecal calibrator when using Techne Works.

On the other hand, the 'H' range can calibrate probes independently of the computer and at the end of the day, the user can download the test results from the Tecal calibrator to the computer to print out the appropriate calibration certificate(s).

A set of software commands is available allowing third party software applications to be developed. For further details, please contact the Techne Sales Department.
All Tecal calibrators have a large heater block (aluminium for the Tecal 140 & 425 models, and aluminium/bronze for the Tecal 650) which provides optimum uniformity and stability. This heater block can accommodate large multi-hole inserts allowing calibration of several probes at one time.
Special inserts are available upon request.

All Techne units are designed and manufactured to BS EN 1S0 9001: 1994 and carry the CE mark.
All Techne equipment conforms to the EMC and Low Voltage Directives.

Calibrate with confidence using the Tecal "Field" Range of Dri-Block Calibrators

A new range of lightweight dry-block thermal calibrators that operate from 45°C below ambient up to 650°C has been developed by Techne for convenient use in the field.

The three models in the new Tecal F range incorporate the precision control system used on Techne's Tecal H and S models to provide excellent reliability and accuracy, with a number of improvements such as an enhanced display resolution of 0.01°C and faster heating and cooling rates.

The Tecal 140F operates between 45°C below ambient (typically -20°C) and 140°C with a temperature accuracy of ±0.3°C and a temperature uniformity of ±0.2°C. Heating time to 100°C is five minutes.

All the models are offered with or without RS-232 communications and can be used with a wide range of inserts to suit different probe sizes. Automatic fan cooling is standard, with accelerated cooling probes also available.

Tecal 140F

Technical Specification

Low temperature Portable Field Temperature Calibrator	
Minimum temperature	45°C below ambient (typically -20°C in ambient of 25°C)
Maximum temperature	140°C
Temperature accuracy	±0.3°C
Temperature uniformity	±0.2°C
Temperature stability	±0.05°C (after 10 mins)
Display resolution	0.01°C or 0.1°F
Set point resolution	0.1°C or 0.1°F
Heating rate, 20°C to 100°C	5 minutes
Cooling rate, 100°C to 0°C	9 minutes
Large well	Ø38mm x 114 mm inserts
Fan cooling	Automatic
DimensionsHxWxDmm	273 x 207 x 289
Weight	11kg

See page 9 for full range of inserts available

140F

Options

- Inserts from standard list type FINSAL-
- RS-232 interface plus software and cable
- Carry case soft
- Carry case hard
- UKAS calibration certificate

Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (kg)
FDB140FD	Tecal 140F	230v	50/60	400	11
FDB140FP	Tecal 140F	120v	50/60	400	11
FDB140FY	Tecal 140F	100v	50/60	400	11
FDB140FR	Tecal 140F with RS-232	230v	50/60	400	11
FDB140FS	Tecal 140F with RS-232	120v	50/60	400	11
FDB140FT	Tecal 140F with RS-232	100v	50/60	400	11
Accessories					
FCALFCSL	Hard Carry case for 140F				8.2
FSC140F	Soft Carry case for 140 + 650F				2.3
6104266	RS-232 cable for use relevant units				0.2

425F

Tecal 425F

The medium-temperature Tecal 425F operates from 5°C above ambient to 425°C and reaches maximum temperature in 12 minutes. It weighs 6.3kg and has the same temperature accuracy and uniformity performance as the 140F model.

Technical Specification

Medium temperature Portable Field Temperature Calibrator	
Minimum temperature	5°C above ambient
Maximum temperature	425°C
Temperature accuracy	±0.3°C
Temperature uniformity	±0.2°C
Temperature stability	±0.03°C at 200°C (after 10 mins)
Temperature stability	±0.05°C at 425°C (after 10 mins)
Display resolution	0.01°C or 0.1°F
Set point resolution	0.1°C or 0.1°F
Heating rate, 20°C to 400°C	12 minutes
Cooling rate, 400°C to 100°C	21 minutes
Large well	Ø38mm x 114mm inserts.
Fan cooling Automatic	
Dimensions H x W x D mm	270 x 170 x 255
Weight	6.3kg

See page 9 for full range of inserts available

Options

- Inserts from standard list type FINSAL-
- RS-232 interface plus software and cable
- Cooling probe for rapid cooling of block
- Carry case soft
- Carry case hard
- UKAS calibration certificate

Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (kg)
FDB425FD	Tecal 425F	230v	50/60	900	6.3
FDB425FP	Tecal 425F	120v	50/60	900	6.3
FDB425FY	Tecal 425F	100v	50/60	790	6.3
FDB425FR	Tecal 425F with RS-232	230v	50/60	900	6.3
FDB425FS	Tecal 425F with RS-232	120v	50/60	900	6.3
FDB425FT	Tecal 425F with RS-232	100v	50/60	790	6.3

The Cooling Probe can be used to rapidly cool the insert – chilled water passes through the probe that fits inserts with 10mm ø hole or larger.

Accessories

Product Code	Model	Net Weight (kg)
FDB00CP	Cooling Probe for 425,650,700X	0.4kg
FCALFCSH	Hard Carry case for 650F	8.2kg
FSC140F	Soft Carry case for 140 + 650F	2.3kg
6104266	RS-232 cable for use relevant units	0.2kg

Tecal 650F

Operating up to 650°C, the Tecal 650F has been designed for high-temperature calibration. Temperature accuracy is ±0.4°C and uniformity within ±1°C throughout the temperature range.

650F

Technical Specification

High temperature Portable Field Temperature Calibrator	
Minimum temperature	25°C above ambient
Maximum temperature	650°C
Temperature accuracy	±0.4°C
Temperature uniformity	±1°C
Temperature stability	±0.09°C (after 10 mins)
Display resolution	0.01°C or 0.1°F
Set point resolution	0.1°C or 0.1°F
Heating rate, 20°C to 600°C	24 minutes
Cooling rate, 600°C to 200°C	21 minutes
Large well	Ø38mm x 152mm inserts.
Fan cooling	Automatic
Dimensions H x W x D mm	278 x 170 x 300
Weight	9.6 kg

See page 9 for full range of inserts available

Options

- Inserts from standard list type FINSAB-
- RS-232 interface plus software and cable
- Cooling probe for rapid cooling of block
- Carry case soft
- Carry case hard
- UKAS calibration certificate

Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (kg)
FDB650FD	Tecal 650F	230v	50/60	1100	9.6
FDB650FP	Tecal 650F	120v	50/60	1100	9.6
FDB650FY	Tecal 650F	100v	50/60	790	9.6
FDB650FR	Tecal 650F with RS-232	230v	50/60	1100	9.6
FDB650FS	Tecal 650F with RS-232	120v	50/60	1100	9.6
FDB650FT	Tecal 650F with RS-232	100v	50/60	790	9.6

The Cooling Probe can be used to rapidly cool the insert – chilled water passes through the probe that fits inserts with 10mm ø hole or larger.

Accessories

Product Code	Model	Net Weight (kg)
FDB00CP	Cooling Probe for 425,650,700X	0.4kg
FCALFCSH	Hard Carry case for 650F	8.2kg
FSC140F	Soft Carry case for 140 + 650F	2.3kg
6104266	RS-232 cable for use relevant units	0.2kg

140H

Tecal S and H range Dri-Block Calibrator

This range of temperature calibrators is ideal for calibrating temperature sensors used in the food and pharmaceutical industries in addition to calibrating any sensors used in the temperature range outlined in the specifications below.

S Version: Set required Temperature and Calibrate

H Version: Set required Temperature and Calibrate; also programmable for switch test and ramp rate etc.

Tecal 140S/H

The Tecal 140S provides a complete system for calibrating most types of thermal sensors used in the temperature range of -40°C to 140°C which includes "K" type thermocouples commonly used in the food industries, cold storage rooms and environmental monitoring systems.

Where automation in both the field and laboratory are required, the combination of the Tecal 140H with the UPI (see page 13) saves time and money. The user can set the program and leave the unit to calibrate the probes, automatically storing the results in memory. This allows the user to attend to other tasks and when convenient download the results to a computer to print the calibration certificate.

Using advanced peltier technology and state-of-the-art mechanical and electrical components, these calibrators can rapidly cover the complete temperature range where speed is of the essence without loss of accuracy or stability. The heater block with a defined measuring zone of 50mm from the bottom of the block allows for different length/active area sensors. Although the quoted accuracy and stability is ±0 .2°C & ±0.05°C respectively, one can often achieve an accuracy of ±0.1°C and a stability of ±0.02°C with high class RTDs and thermocouples.

Technical Specification – Note improved Specification 2011

Minimum temperature	45°C below ambient[1] (-60°C cooling)
Maximum temperature	140°C
Temperature accuracy in measuring zone.	±0.2°C
Temperature uniformity in measuring zone	±0.2°C[2]
Measuring zone	0 to 50mm from base of well
Temperature stability after 10min	±0.05°C
Display resolution	0.1°C
Heating rate, 20°C to 100°C	5 minutes
Cooling rate, 100°C to 0°C	9 minutes
Programmable ramp rate, °C/min	0.1 to 10, on H version
Switch test	on H version
Comms port, 9 way D type	Full bi-directional RS-232
Weight	14.0(S), 14.4(H) kg
Dimensions H x W x D, mm	285 x 190 x 426

[1] In a maximum ambient temperature of 20°C and when using the CH-5 Chiller a temperature of -40°C can be achieved.

[2] At 100°C

See page 9 for full range of inserts available.

Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (kg)
FDB140SD	TECAL 140S	230V	50/60	400	13.5
FDB140SP	TECAL 140S	120V	50/60	400	13.5
FDB140SY	TECAL 140S	100V	50/60	400	13.5
FDB140HD	TECAL 140H	230V	50/60	400	14.0
FDB140HP	TECAL 140H	120V	50/60	400	14.0
FDB140HY	TECAL 140H	100V	50/60	400	14.0

Accessories

FCALCASE	Hard Carry case for Tecal H and S models	8.6kg

Tecal 425S/H

These calibrators use large aluminium Heater blocks to give fast heating and cooling rates which provide high accuracy, uniformity and stability up to 425°C.

S Version: Set required Temperature and Calibrate

H Version: Set required Temperature and Calibrate also programmable for switch test and ramp rate etc.

Both 425 models are equipped with a large fan in order to quickly cool the blocks to 20 degrees above ambient. Suitable for many applications in both the field and laboratory .

425S

425H

Technical Specification

Minimum temperature	20°C above ambient
Maximum temperature	425°C
Temperature accuracy in measuring zone	±0.3°C
Temperature uniformity in measuring zone	±0.2°C[1]
Measuring zone	0 to 50mm from base of well
Temperature stability after 10min	±0.05°C
Display resolution	0.1°C
Heating rate, 20°C to 400°C (230/120v)	15 minutes
Cooling rate, 400°C to 100°C	25 minutes
Programmable ramp rate, °C/min	0.1 to 10, on H version
Switch test	on H version
Fan cooling	Automatic
Comms port, 9 way D type	Full bi-directional RS-232
Weight, kg	9.2(S), 9.6(H)
Dimensions H x W x D, mm	285 x 190 x 426

[1] At 300°C

See page 9 for full range of inserts available.

Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (kg)
FDB425SD	TECAL 425S	230V	50/60	700	9.5
FDB425SP	TECAL 425S	120V	50/60	700	9.5
FDB425SY	TECAL 425S	100V	50/60	500	9.5
FDB425HD	TECAL 425H	230V	50/60	700	10.0
FDB425HP	TECAL 425H	120V	50/60	700	10.0
FDB425HY	TECAL 425H	100V	50/60	500	10.0

Accessories

The Cooling Probe can beused to rapidly cool the insert – chilled water passes through the probe that fits inserts with 10mm ø hole or larger.

Product Code	Model	Net Weight (kg)
FDB00CP	Cooling Probe for 425,650,700X	0.4kg
FCALCASE	Hard Carry case for Tecal H and S models	8.6kg

650S

Tecal 650S/H

This temperature calibrator is ideal for calibrating temperature sensors used in the food and pharmaceutical, petrochemical and power generation industries as well as calibrating any sensors used in the temperature range outlined in the specification below.

S Version: Set required Temperature and Calibrate

H Version: Set required Temperature and Calibrate also programmable for switch test and ramp rate etc.

The 650 models have large aluminium-bronze blocks which can house large single or multi-hole inserts. These inserts can accommodate probes to a depth of 152.4mm providing high stability and uniformity. All models are equipped with high-powered band heaters and two fans in order to rapidly heat and cool the temperature probe block to the required range of temperatures.

Technical Specification

Minimum temperature	25°C below ambient
Maximum temperature	650°C
Temperature accuracy in measuring zone.	±0.4°C
Temperature uniformity in measuring zone	±1°C[1]
Measuring zone	0 to 50mm from base of well
Temperature stability after 10mins	±0.09°C
Display resolution	0.1°C
Heating rate, 20°C to 600°C	35 minutes
Cooling rate, 600°C to 200°C	30 minutes
Programmable ramp rate, °C/min	0.1 to 10, on H version
Switch test	on H version
Comms port, 9 way D type	Full bi-directional RS-232
Weight,	11.8(S), 12.2(H) kg
Dimensions H x W x D, mm	285 x 190 x 426

Immersion Depth =152.4mm

[1] At 400°C

650H

See page 9 for full range of inserts available.

Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (kg)
FDB650SD	TECAL 650S	230V	50/60	1100	12.5
FDB650SP	TECAL 650S	120V	50/60	1100	12.5
FDB650HD	TECAL 650H	230V	50/60	1100	13.0
FDB650HP	TECAL 650H	120V	50/60	1100	13.0

Accessories

The Cooling Probe can be used to rapidly cool the insert – chilled water passes through the probe that fits inserts with 10mm ø hole or larger

Product Code	Model	Net Weight (kg)
FDB00CP	Cooling Probe for 425,650,700X	0.4kg
FCALCASE	Hard Carry case for Tecal H and S models	8.6kg

Ordering Information

Tecal 140F / 140S / 140H / 425F / 425S / 425H Inserts (Immersion Depth 101mm)

Product Code	Description	Net weight kg
FINSALA	Insert 5 x 6mm probes aluminium	0.5
FINSALB	Insert 10 + 8 + 6 + 4.5 + 3mm probes aluminium	0.5
FINSALC	Insert 2 x 6mm + 2 x 10mm probes aluminium	0.5
FINSALD	Insert 2 x 6mm + 2 x 12mm probes aluminium	0.5
FINSALE	Insert 1 x 6mm probe aluminium	0.5
FINSALF	Insert 5 x 1/4" probes aluminium	0.5
FINSALG	Insert 3/8" + 5/16" + 1/4" + 3/16" + 1/8" probe aluminium	0.5
FINSALH	Insert 2 x 3/8" + 2 x 1/4" probes aluminium	0.5
FINSALI	Insert 2 x 1/2" + 2 x 1/4" probes aluminium	0.5
FINSALJ	Insert 1 x 1/4" probe aluminium	0.5
FINSALK	Insert blank aluminium	0.5
FINSALL	Insert 9/16" probe aluminium	0.5
FINSALM	Insert 5/8" probe aluminium	0.5
FINSALN	Insert 11/16" probe aluminium	0.5
FINSALO	Insert 3/4" probe aluminium	0.5
FINSALP	Insert 11 + 9 + 5 + 4 mm probes aluminium	0.5
FINSALQ	Insert 6mm probe aluminium (immersion depth 40mm)	0.5
FINSALR	Insert 6mm + 9mm probes aluminium	0.5
FINSALT	Insert 9 x 3.18mm probes aluminium	0.5
FINSALX	Aluminium insert 6 x 4mm probes	0.5
FINSALZ	Insert 20mm probe aluminium	0.5
FINSALAB	Aluminium insert 8 x 3.18mm + 1 x 6mm probes	0.5
FINSALAC	Aluminium insert 6.6mm + 19.5mm probes	0.5
FINSALAD	Aluminium insert 2x8mm / 6mm / 9mm probes	0.5
FINSALAF	Aluminium insert 6x3mm probes	0.5
FINSALAH	Aluminium insert 16mm probes	0.5
FINSALAL	Aluminium insert 2x6mm + 3x3.5mm probes	0.5
FINSALAM	Aluminium insert 4x10mm probes	0.5
FINSALAV	Aluminium insert 2x6mm + 1x12mm + 1x 15mm probes	0.5
FINSALAW	Aluminium insert 2x10mm + 2x7mm probes	0.5
FINSALAY	Aluminium insert 1x6mm + 8x1.5mm probes	0.5

Tecal 650F / 650S / 650H / 700X Inserts (Immersion Depth 152mm)

Product Code	Description	Net weight kg
FINSABA	Insert 5 x 6mm probes aluminium bronze	1.1
FINSABB	Insert 10 + 8 + 6 + 4.5 + 3mm probes aluminium bronze	1.1
FINSABC	Insert 2 x 6mm + 2 x 10mm probes aluminium bronze	1.1
FINSABD	Insert 2 x 6mm + 2 x 12mm probes aluminium bronze	1.1
FINSABE	Insert 1 x 6mm probe aluminium bronze	1.1
FINSABF	Insert 5 x 1/4" probes aluminium bronze	1.1
FINSABG	Insert 3/8" + 5/16" + 1/4" + 3/16" + 1/8" probes aluminium bronze	1.1
FINSABH	Insert 2 x 3/8" + 2 x 1/4" probes aluminium bronze	1.1
FINSABI	Insert 2 x 1/2" + 2 x 1/4" probes aluminium bronze	1.1
FINSABJ	Insert 1 x 1/4" probe aluminium bronze	1.1
FINSABK	Insert blank aluminium bronze	1.5
FINSABL	Insert 9/16" probe aluminium bronze	1.1
FINSABM	Insert 5/8" probe aluminium bronze	1.1
FINSABN	Insert 11/16" probe aluminium bronze	1.1
FINSABO	Insert 3/4" probe aluminium bronze	1.1
FINSABP	Insert 19.5mm probe aluminium bronze	1.1
FINSABQ	Insert 10/8/6/4/3mm probe aluminium bronze	1.1
FINSABR	Insert 12mm probe aluminium bronze	1.1
FINSABS	Insert 15mm probe aluminium bronze	1.1
FINSABW	Aluminium bronze insert 7 x 3.5mm probes	1.1
FINSABZ	Aluminium bronze insert 20mm probe	1.1
FINSABAD	Aluminium bronze insert 6.5/11mm / 2x16.5mm probes	1.1
FINSABAE	Aluminium bronze insert 6/10mm / 2x13mm probes	1.1
FINSABAI	Aluminium bronze insert 2x¼" + 6mm + 3mm probes	1.1
FINSABAJ	Aluminium bronze insert 10+8+6.5+6mm probes	1.1
FINSABAN	Aluminium bronze insert 33 probe	1.0
FINSABAO	Aluminium bronze insert 9x3mm probes	1.1

700X

Tecal 700X Precision Dri-Block Temperature Calibrator

The Tecal 700X offers precise temperature control stability up to 700°C. This unit gives market leading stability and accuracies up to and above the melting point of Aluminium at 660°C. For optimum performance you can count on Techne thermal solutions.

- Very economically priced
- Wide temperature range
- Switch test functions
- Large multi-hole fixed block with slim inserts to match most common size probes
- Solid block giving unrivalled temperature uniformity
- Rapid heating and cooling rates.
- New built USB connection to TechneWorks software package

The Tecal 700X Block calibrator utilises a special heater block design giving optimum temperature uniformity and rapid heating rates. The block has 6 fixed bores either metric or imperial sizes with a slim insert matching any of the bores. This block is designed to give unrivalled uniformity across the block but also allow the maximum flexibility between test probe sizes. The block design allows fast heat up and cool down rates while minimising the weight of the unit.

Technical Specifications

Minimum temperature	Ambient + 25°C
Maximum temperature	700°C
Display accuracy	± 0.25°C at 700°C
Temperature uniformity	±0.04°C radial and ±0.4°C axial
Temperature stability	±0.03°C (@ 700°C) and ±0.005°C (@ 100°C)
Display resolution	0.01°C selectable °C or °F
Heating rate, amb to 700°C	25 minutes
Cooling rate, 700°C to 100°C	30 minutes
Slim insert blank size (Metric)	Ø15mm x 156 mm long. Fixed block Ø15/10/8/6/4.5/3mm
Slim insert blank size (Imperial)	Ø3/8" x 156 mm long. Fixed block Ø 5/8, 3/8, 5/16, 1/4, 3/16, 1/8"
Fan cooling	Automatic
Communication	USB
Dimensions H x W x D	285 x 190 x 426mm
Weight	10kg

Ordering Information

Product Code	Model
FDB700XS	Tecal 700X 230v with USB comms
FDB700XP	Tecal 700X 120v with USB comms
FDB700XD	Tecal 700X 230v with large removable block + USB comms
FDB700XR	Tecal 700X 120v with large removable block + USB comms

Accessories

Product Code	Model
FSC700X	Soft Carry case 700X
FCALCASE	Hard Carry case 700X
Insert blocks - Aluminium bronze Ø15 x 156mm long	
FINS7100	Insert Block probe 10.0mm
FINS7080	Insert Block probe 8.0mm
FINS7060	Insert Block probe 6.0mm
FINS7045	Insert Block probe 4.5mm
FINS7030	Insert Block probe 3.0mm
FINS7BLM	Insert Block BLANK METRIC
Insert blocks - Aluminium bronze Ø5/8" x 156mm long	
FINS7375	Insert Block probe 3/8"
FINS7312	Insert Block probe 5/16"
FINS7250	Insert Block probe 1/4"
FINS7220	Insert Block probe 7/32"
FINS7187	Insert Block probe 3/16"
FINS7125	Insert Block probe 1/8"
FINS7BLI	Insert Block BLANK IMPERIAL
FCALUSB	USB cable ip68 mini 'B' to std 'A' type

Tecal 1200S High Temperature Portable Calibration Furnace

1200S

Calibrate with Confidence with the NEW Tecal 1200S High Temperature Portable Calibration Furnace. When precise temperature control is essential for optimum performance you can count on Techne thermal solutions.

Key Features

- Very economically priced
- Wide temperature range
- Simple to use
- Multi-hole insert block for accurate comparison calibration
- Rapid heating rates
- Software available
- Rugged case with carry handle

The Tecal 1200S Block calibrator utilises a special heater design for optimum temperature uniformity and rapid heating rates. The isothermal block assembly is machined from a special alloy giving excellent thermal conductivity which also resists high-temperature oxidation. This block is designed to optimize performance between sufficient mass for good stability/ uniformity but a low enough mass to achieve rapid heating/cooling rates and stabilization periods. The standard fixed block has 4 extra deep immersion test holes accepting Ø8mm probes x 80 mm deep for use with a reference probe typically an R or S type thermocouple or an SPRT.

Technical Specification

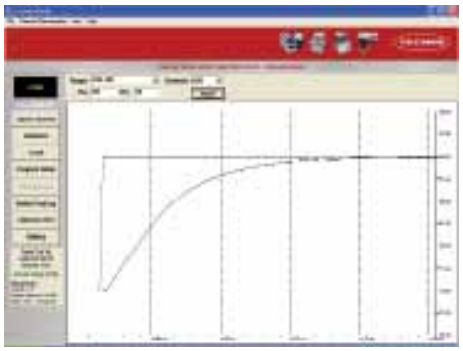
Minimum temperature	150°C
Maximum temperature	1200°C
Display accuracy	±3°C
Temperature uniformity	±0.2°C
Temperature stability	±0.2°C (at 1200°C after 20 mins)
Display resolution	0.1°to 999.9 then 1°to 1200°C Selectable °C or °F
Heating rate, 100°C to 1200°C	20 minutes
Cooling rate, 1200°C to 200°	140 minutes
Large insert size	Ø34mm x 155 mm with 4 off bores Ø8mm x 80 depth
Fan cooling	Automatic
Dimensions H x W x D	350 x 200 x 300mm
Weight	10kg

Ordering Information

FDB1200XS	Tecal 1200 S 230v with RS-232
FDB1200XP	Tecal 1200 S 120v with RS-232

Accessories

FCAL1200	Hard Carry case 1200S
Insert blocks	Ø34 x 155mm long
FINS1200A	Insert Block probe 4x Ø8.0mm (Standard insert)
FINS1200B	Insert Block probe 2xØ3mm,2xØ4mm,2xØ6mm
FINS1200C	Insert Block probe Ø1/8”,Ø1/4”, Ø3/16”, Ø5/16”, Ø3/8”
FINS1200D	Insert Block probe 2xØ3/16”,2xØ1/4”, 2xØ3/8”
FINS1200E	Insert Block probe 6x Ø1/4”
Ceramic Top insulator	
FCER1200A	Insulator A for block 4 x Ø8.0mm (Standard insert) Included with the unit
FCER1200B	Insulator B for block 2 x Ø3mm, 2 x Ø4mm, 2 x Ø6mm
FCER1200C	Insulator C for block Ø1/8”, Ø1/4”, Ø3/16”, Ø5/16”, Ø3/8”
FCER1200D	Insulator D for block 2 x Ø3/16”,2 x Ø1/4”, 2 x Ø3/8”
FCER1200E	Insulator E for block 6 x Ø1/4”
FCAL1200	Hard carry case 1200S
FCERT1200	UKAS cal cert at 150, 420, 660, 960, 1200°C



TechneWorks

Techne are pleased to announce the introduction of our FREE OF CHARGE, easy to use Control software for many of our RS-232 compatible products.This software has been designed to supersede the existing Calsoft and Thermsoft software packages.

It will allow customers to carry out all the tasks previously available on Calsoft and Thermsoft plus many new options on one new package. It is fully compatible with all Techne RS-232 Calibration products including all current models and older discontinued models such as the TU-20C.

Compatible units are as follows:-

Dri-Block Calibrators	- Tecal H, S and F models
	- New Tecal 1200S High temperature furnace
Thermoregulators	- TU-20D and TU-20HT (and TU-20C)
Precision Digital Thermometer	- Accu-Temp with RS-232 communication option
Fluidised Baths	- FB-08C and TC-8D with RS-232 communication option

TechneWorks software allows connection to a range of Precision Thermometers such as the Techne Accu-Temp, ASL model F250, Accu-TempII and the Cropico 3000 series. TechneWorks software enables you to calibrate thermometers and sensors and to then generate calibration certificates using a Techne Liquid bath or Dry block as a temperature source. The Calibration bath or Dri-Block's display can act as the reference temperature or connect to a range of external thermometers.

Software Features

ALL MODELS

- Create, open and save programs with up to 20 set points.
- Specify either °C or °F.
- Specify ramp rates and hold times.
- Log data from the instrument while connected to the computer and export the data in an Excel spreadsheet.
- Open, save, view and print logged data.
- Perform a calibration where temperature of the probe is manually entered.
- Perform an automatic calibration routine where the temperature reference probes data is added automatically.
- Run a program in real time mode.
- Specifying the logging interval from every 5 seconds to 60 seconds
- Set ramp rates from 0.1 to 10.0°C/min

TECAL H MODELS ONLY has above features plus the following:-

- Perform a calibration using the User Probe Interface
- Perform a calibration requiring a switch test
- Send programs to the calibrator
- Retrieve programs from the calibrator
- Retrieve test results from the calibrator
- Erase test results
- (downloadable free of charge from www.techne.com and www.techne-calibration.com)
- Note: CD with software included with Tecal H and TU-20HT models

The TechneWorks software is available as a Factory enabled version which allows re-Calibration of our Tecal Calibrators. This supersedes the Factory Calsoft software.

Utilities button is only available on enabled version.

User Probe Interface (UPI)

The UPI can automatically calibrate temperature sensors without the need for user intervention. Simply connect the UPI to the front panel of any of the Tecal 'H' range of dri-block calibrators.

With the UPI you can realise a fully automated and unattended calibration of your temperature sensors saving both time and money. Simply place the sensor into the block insert and connect to the appropriate front panel terminals, switch the UPI on and select your sensor type.

The UPI accepts types K, J, N, T and E thermocouples along with 100 and 1000 ohm 3 and 4 wire RTD's. You can also connect the UPI in series with 4 to 20mA current loop sensors and the current reading of the transmitter will be displayed. Sensor wires are connected using standard 4mm banana sockets with screw down pillars.

User Probe Interface (UPI)

Technical Specification

Probe	Type	Resolution	Accuracy	Range
K	t/c	0.1°C	±0.5°C or ±0.3%	-50 to 650°C
J	t/c	0.1°C	±0.5°C or ±0.3%	-50 to 650°C
N	t/c	0.1°C	±0.5°C or ±0.3%	-50 to 650°C
T	t/c	0.1°C	±0.5°C or ±0.3%	-50 to 400°C
E	t/c	0.1°C	±0.5°C or ±0.3%	-50 to 650°C
100Ω	RTD	0.1°C	±0.3°C or ±0.1%	-50 to 650°C
1000Ω	RTD	0.1°C	±0.3°C or ±0.1%	-50 to 650°C
0-10	mA	1.0µA	±2.0µA or ±0.002mA	0 to 10mA
10.1 to 20.0	mA	1.0µA	±2.0µA or ±0.02%	10.1 to 20mA

Ordering Information

Product Code	Model	Voltage	Net Weight (kg)
FPRINTD	User Probe Interface (UPI)	230V UK	1.5
FPRINTE	User Probe Interface (UPI)	230V EU	1.5
FPRINTP	User Probe Interface (UPI)	120/100V	1.5

CE-350

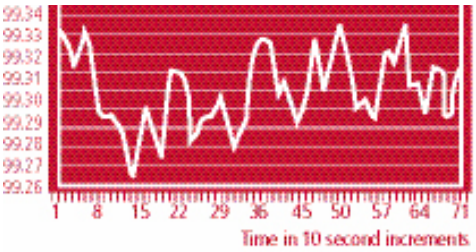
Portable Dri-Block® Calibrator model CE-350

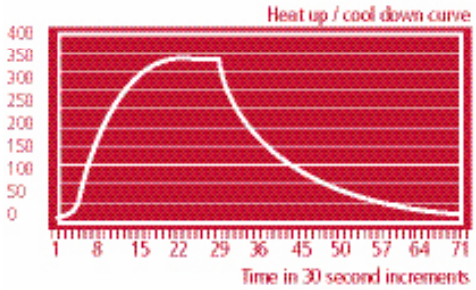
The CE-350 is a low-cost alternative to the Tecal 425 models where routine checking of RTD and thermocouples is required.

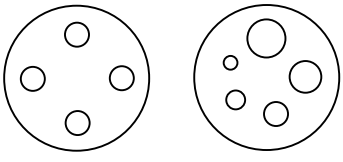
For some applications, it is important that the unit is very portable (the CE-350 weighs only 1.5kg) and can calibrate the sensors as quickly as possible (can heat and cool over the temperature range in a matter of minutes).

Typical applications where the CE-350 can be used are in checking fire alarm detectors, industrial ovens, dryers, etc.

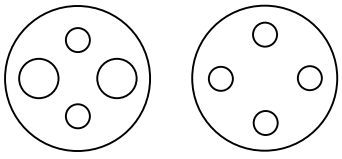
- Large block in 12 formats with custom options also available
- Maximum temperature 350°C
- An independent over temperature cut-out
- Temperature sensor burnout protection
- Separate heater on/off switch for fast cool down without changing set temperature
- Indicators for over temperature cut-out and heater power
- IS0 9001 and CE marked
- Switchable °C/°F
- Three year warranty
- Calibration depth 101 mm



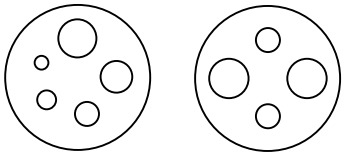




Block A Block B



Block C Block D



Block E Block F

Technical Specification

Temperature range	20°C above ambient to 350°C
Working ambient	10°C to 30°C
Heat up 20°C to 300°C	5.2 minutes (230v version only)
Cool down 300°C to 100	10.8 minutes°C
Stability @ 100°C	±0.10°C
Stability @ 200°C	±0.15°C
Accuracy 100-300°C	±1°C
Accuracy below 100°C	±0.5°C
Display resolution	0.1°C
Fan cooling	Automatic
Weight	1.5 kg
Dimensions H x W x D, mm	72 x 128 x 178 (excluding handle)
Power supply	230v 50/60Hz 2A or 120v 50/60Hz 4A
Watts	400w

Ordering Information

Product Code	Block Options	Block Type	Voltage
FCE350AD	4 x 6mm	A	230V
FCE350AP	4 x 6mm	A	120V
FCE350BD	1 x 10mm, 8mm, 6mm, 4.5mm 3mm	B	230V
FCE350BP	1 x 10mm, 8mm, 6mm, 4.5mm 3mm	B	120V
FCE350CD	2 x 6mm, 2 x 10mm	C	230V
FCE350CP	2 x 6mm, 2 x 10mm	C	120V
FCE350DD	4 x 1/4"	D	230V
FCE350DP	4 x 1/4"	D	120V
FCE350ED	1 x 3/8", 5/16", 1/4", 3/16", 1/8"	E	230V
FCE350EP	1 x 3/8", 5/16", 1/4", 3/16", 1/8"	E	120V
FCE350FD	2 x 1/4" 2 x 3/8"	F	230V
FCE350FP	2 x 1/4" 2 x 3/8"	F	120V

Accessories

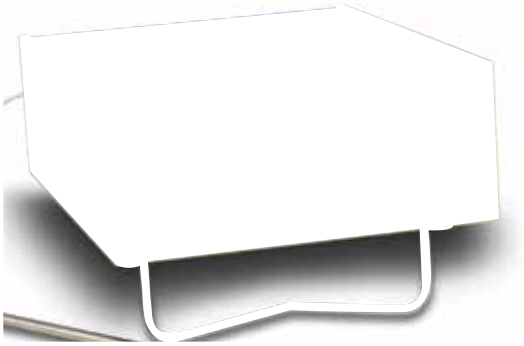
6103526	Soft carry case

Accu-Temp Precision RTD Thermometer

The Tecal Accu-Temp RTD thermometer is an excellent choice for use as a laboratory grade reference thermometer.

It offers the flexibility of two RTD input channels, along with direct temperature readout in degrees °F, °C and ohms. Combine the Tecal Accu-Temp with one of our PRT's for a high accuracy temperature measurement system.

- User programmable linearisation (ITS90)
- Accepts either 10, 25.5 or 100 ohm platinum RTD's
- Direct readout in °C, °F, and ohms
- Temperature accuracy of ±0.015°C up to 500°C
- Temperature and ohm meter resolution of 0.001
- Wide temperature range -200 to +660°C
- Accepts probe alphas of either 0.00385 or 0.003925
- Single or dual RTD input channels
- Switchable 230 or 120V operation
- Includes NIST traceable calibration certificate



Accu-Temp Precision RTD Thermometer

Technical Specification

Temperature accuracy of thermometer					
	-100°C	0°C	200°C	400°C	500°C
+/-	0.005(0.009°F)	0.005(0.009°F)	0.007(0.013°F)	0.011(0.020°F)	0.013(0.023°F)
	Ohmmeter uncertainty		+/-0.002 ohms or 15 ppm		

Dimensions h x w x d	90 x 220 x 295
Weight	4kg (5.5 kg shipping)
Option	RS-232 interface

Accu-Temp Precision RTD Thermometer and PRT probe

Ordering Information

Product Code	Model	Voltage
FACTMPD	Accu-Temp RTD Thermometer	230/120v Dual Channel
FACTMPS	Accu-Temp RTD Thermometer	230/120v Single Channel
FACTMRD	Accu-Temp RTD Thermometer	230/120v Dual Channel + RS-232
FACTMRS	Accu-Temp RTD Thermometer	230/120v Single Channel + RS-232

See page 19 and 20 for RTD probes for use with the Accu-temp and Accu-temp II

Tecal Accu-Temp II

Tecal Accu-Temp II Laboratory Grade Reference Thermometer

The Tecal Accu-Temp II is a high accuracy multi purpose digital thermometer for both platinum resistance thermometers and thermocouples. Dual Channel input allows a probe on Channel B to be calibrated against a standard on Channel A - directly compare any combination of PRT and Thermocouple. The Tecal Accu-Temp II supports 13 thermocouple Types B, E, J, K, N, R, S, T, D, C, l, U, Au/Ptand both 3 and 4 wire 100 ohm Platinum resistance thermometers and RTDs.

- Accuracy of RTD and PRT measurement ±0.010 °C
- Accuracy of T/C measurement, better than ±0.1 °C
- 0.001 resolution for RTDs/PRTs and thermocouples
- 2 measuring inputs
- 13 thermocouples: B, E, J, K, N, R, S, T, D, C, l, U, Au/Pt
- T/C CJC internal or external
- Input of RTD coefficients:Calendar Van Dusen & ITS90
- Probe self-heat check
- Automatic current reversal for RTDs/PRTs
- Suitable for 3 and 4 wire RTDs/PRTs
- Units °C, °F, K, mV, ohms
- Math functions max/min, std. deviation & mean
- Data logging 4000 values
- Expandable by plugging in optional 4 input RTD or thermocouple scanner cards to 1 of 2 rear panel slots available.
- RS232 talk/listen - included
- Rechargeable sealed lead acid battery: 8 hrs operation continuous

The powerful math function enables statistical analysis of the captured data, mean, max, min, peak and standard deviation. The Tecal Accu-Temp II can be expanded by adding either a 4 input Thermocouple or 4 input PRT card into one of the two available slots in the rear of the unit. Ultimately two cards of the same type could be added toallow the measurement of up to 10 sensors of the same type or one PRT as a reference and nine thermocouples. Each unit includes an RS232 cable, NIST traceable calibration, instruction manual and mains cable. Combine the Tecal Accu-Temp II with one of Techne's Secondary Standard PRTs, a Techne Dry block calibratoror liquid calibration bath and Techneworks software to create a thermometer and sensor calibration system with high overall accuracy.

Technical Specification

Dimensions	219mm W x 315mm H x 110mm D
Weight	5.5kg approx

Thermocouple Accuracy

Type	Range °C	Resolution °C˚, °F or K	Display Resolution mV	Uncertainty @20 °C °C 5± ° 1 year	Uncertainty @20 °C °C 5± ° 60 days	Temperature Coefficient /°C
B	+250 to +1820	0.001	1.0	±(0.025% Rdg + 0.006% FS)*	±(0.02% Rdg + 0.006% FS)*	7 ppm Rdg + 6 ppm FS
C	0 to +2315	0.001	1.0	±(0.075% Rdg + 0.005% FS)	±(0.05% Rdg + 0.005% FS)	7 ppm Rdg + 6 ppm FS
D	0 to +2315	0.001	1.0	±(0.75% Rdg + 0.005% FS)	±(0.05% Rdg + 0.005% FS)	7 ppm Rdg + 6 ppm FS
E	-200 to +1000	0.001	1.0	±(0.026% Rdg + 0.004% FS)	±(0.01% Rdg + 0.004% FS)	7 ppm Rdg + 6 ppm FS
J	-210 to +1200	0.001	1.0	±(0.03% Rdg + 0.005% FS)	±(0.008% Rdg + 0.005% FS	7 ppm Rdg + 6 ppm FS
K	-200 to +1372	0.001	1.0	±(0.035% Rdg + 0.006% FS)	±(0.01% Rdg + 0.006% FS)	7 ppm Rdg + 6 ppm FS
N	-200 to +1300	0.001	1.0	±(0.035% Rdg + 0.005% FS)	±(0.01% Rdg + 0.005% FS)	7 ppm Rdg + 6 ppm FS
R	-50 to +1768	0.001	1.0	±(0.02% Rdg + 0.015% FS)	±(0.005% Rdg + 0.015% FS)	7 ppm Rdg + 6 ppm FS
S	-50 to +1768	0.001	1.0	±(0.02% Rdg + 0.015% FS)	±(0.005% Rdg + 0.015% FS)	7 ppm Rdg + 6 ppm FS
T	-200 to +400	0.001	1.0	±(0.025% Rdg + 0.015% FS)	±(0.005% Rdg + 0.015% FS)	7 ppm Rdg + 6 ppm FS
U	-200 to +600	0.001	1.0	±(0.025% Rdg + 0.015% FS)	±(0.005% Rdg + 0.015% FS)	7 ppm Rdg + 6 ppm FS
L	-200 to +600	0.001	1.0	±(0.03% Rdg + 0.005% FS)	±(0.008% Rdg + 0.005% FS)	7 ppm Rdg + 6 ppm FS
Au/Pt	0 to +1000	0.001	1.0	±(0.02% Rdg + 0.015% FS)	±(0.005% Rdg + 0.015% FS)	7 ppm Rdg + 6 ppm FS

RTD & PRT Accuracy

Type	Range °C	Resistance	Current	Resolution	Resistance °C, °F or K	Accuracy Typically @20°C ±
Pt100	-200 to 660	18 to 340Ω	0.5mA	0.001	0.001Ω	0.010
Pt100	660 to +450	340 to 450Ω	0.5mA	0.001	0.001Ω	0.020

Technical Specification

Display
LCD Graphics Panel, 240 x 64 Dot, with LED backlight contrast control via Keyboard.

Inputs
Thermocouples via 4mm sockets in copper block on 19mm pitch adaptor plug for direct connection of thermocouple wire. Reference Junction Compensation - Automatic with external Pt100 probe. PRT's via 6-pin Lemo socket, also used for external RJ measurement.

Calibration
Digital, security code protected.

Working Temperature
0 to 40°C rel humidity.
80% max non condensing.

Storage Temperature
-20 to +50°C.

Mains Supply
100/120/220/240 Volts + 10% - 13% 47 to 63Hz max. 40VA.

Dimensions
219mm W x 315mm H x 110mm D

Weight
5.5 kg approx

Data Logging
The Tecal Accutemp II Thermometer comes complete with a data logging function, enabling up to 4000 single channel (2000 dual channel) readings to be stored together with a date and time stamp. The stored values can be recalled to the instrument display and scrolled througth using the front panel keyboard, alternatively these values can be downloaded to a PC file or printer.

Battery
Sealed lead acid, rechargeable cell giving approximately 8 hours continous operation. Internal battery charger.

Maths
Displays max/min values Peak to Peak, mean & standard deviation.

Analogue Output - optional
This is a factory fitted option comprising of of a single BNC socket fitted to the rear panel. The function is as per the main value display and is scaled 1mV°C. A 12 bit D/A is used and the resolution is 0.5°C.

Expansion cards - optional
There are two expansion slots in the rear panel which will accept a 4 Input therocouple or RTD plug and play card giving a total of 8 additional channels.

IEEE-488 optional
Conforms to the ANSI-IEEE Std 488.1-1987. The interface performs the following functions: SH1, AH1, T5, TEO, L3, LEO, SR1, RL1, RL1, PPO, DC1, DT1, C0, E2. The interface can also be set to a talk only mode to permit stand alone printer output.

Ordering Information

Product Code	Model	Voltage	Shipping Weight
FACT2PD	Tecal Accu-Temp II thermometer	120 & 240 switchable	5.5
FACT2TC	4 input Thermocouple scanner card	N/A	0.9
FACT2PC	4 input RTD scanner card	N/A	0.9
FACT2LC	Front panel RTD Lemo connector	N/A	0.1

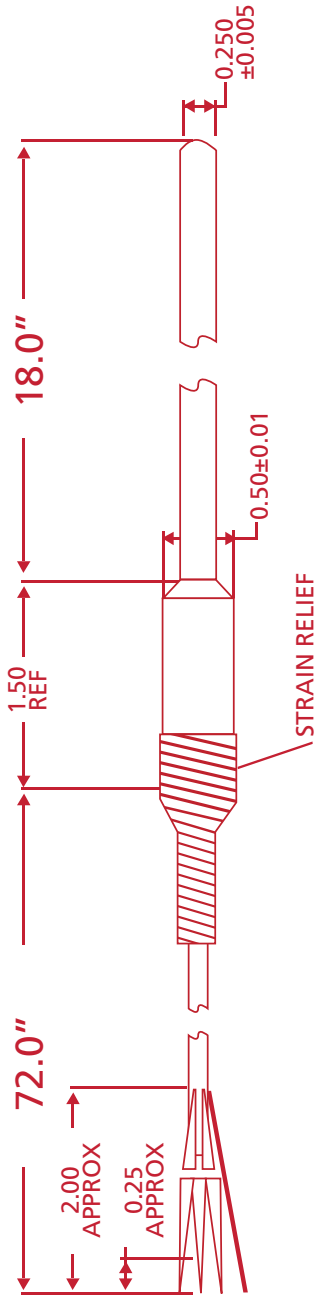
See page 19 and 20 for RTD probes for use with the Accu-temp and Accu-temp II

RTD Probes

The Techne **Model WSP425** and **SSP670 PRT's** are an excellent choice for use as a reference sensor in all types of systems including dry block calibrators, liquid calibration baths, ovens, reactors and other applications where temperature needs to be accurately measured.

Our PRT's offer proven and reliable performance for critical temperature measurements. They can be used with our Tecal Accu-Temp indicator or any comparable unit. Both models include a carrying case and ITS-90 calibration (NIST traceable) certificate with coefficients and resistance vs. temperature table. The SSP670 has excellent performance, specifications and wide temperature range at an affordable price, while the WSP425 is designed for measurements within a narrower temperature range.

The model WSP425 has a NIST calibrated operating range of -50 to +350ºC with an accuracy of ±0.07ºC, while the model SSP660 has a NIST calibrated operating range of -200 to +660ºC with an accuracy of ±0.05 up to 420ºC



660ºC Secondary Standard PRT

Model SSP670 PRTs are assembled using our special wire wound RTD elements and assembled into inconel sheaths. The SSP670 PRT has similar accuracy and long-term stability specifications you would find in much higher priced secondary standard PRTs.

The SSP670 PRT can be used as a working standard in calibration baths, furnaces, fluidized baths, dry block calibrators and other any other temperature calibration work requiring a high level of accuracy and repeatability.

Technical Specification

Resistance at 0° C:	100 ohms
Temperature range:	-200 to 660°C
Calibrated temperature range:	-196 to 660°C
Temperature coefficient:	0.003925 Ω /Ω /° C minimum
Stability:	R0 typical drift < 0.03°C after 500 hours at 660° C
Thermal shock:	R0 typical drift < 0.010° C after 100 times from 25 to 660°C
Dimensions:	0.25" dia. x 18" L inconel sheath as standard, custom sizes available
Tolerance at 0° C:	± 0.06%, IEC DIN class A
Lead wires:	4 wire PTFE insulated, stranded 22 AGW copper x 6" long

Calibration

Each WSP670 includes an ITS-90 NIST traceable calibration with a+, b+, c+, a- and b- coefficients and R vs T table. A padded soft carrying case is also included.

Calibrated uncertainty (K=2)	**FWSP660M 660°C Secondary Std 6mm PRT** **FWSP660I 660°C Secondary Std ¼" PRT**
-196°C ±0.050°C	
-38°C ±0.035°C	
0°C ±0.020°C	
232°C ±0.030°C	
420°C ±0.045°C	
660°C ±0.055°C	

Accessories

FWSP660M	660°C Secondary Std 6mm PRT
FWSP660I	660°C Secondary Std ¼" PRT

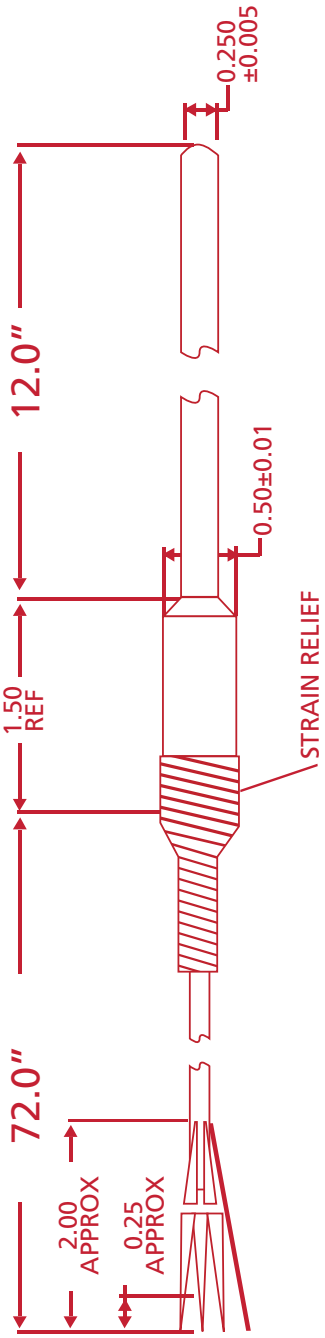
425°C Working Standard PRT

The model WSP425 PRT is a good choice for lower temperature range is required.

The sheath is of stainless steel construction with a strain free wire wound .3924 alpha sensing element.

The WSP425 PRT can be used as a working standard in calibration baths, furnaces, fluidized baths, dry block calibrators or for any other temperature calibration work.

Combine it with our model Tecal Accu-Temp RTD indicator for a system with high overall accuracy. The WSP425 PRT includes a NIST traceable ITS-90 calibration with coefficients and R vs T table.



Technical Specification

Resistance at 0° C:	100 ohms
Temperature range:	-200 to 425°C
Calibrated temperature range:	-50 to 425°C
Temperature coefficient:	0.003924 Ω /Ω /° C minimum
Stability:	Meets IEC stability specifications after 250 hours exposure to extremes of temperature range. Typical drift is less than 0.05°C (0.02Ω) at 0°C.
Repeatability:	Meets IEC requirements. Typical shift less than 0.05°C (0.02Ω) at 0°C after ten cycles over range.
Dimensions:	0.25" dia. x 12" L , custom sizes available
Tolerance at 0° C:	± 0.06%, IEC DIN class A
Lead wires:	4 wire PTFE insulated, stranded 22 AGW copper x 6" Long

Calibration

Each WSP350 PRT includes an ITS-90 NIST traceable calibration with a+, b+, a- and b- coefficients and R vs T table. A padded carrying case is also included.

Calibrated uncertainty (K=2)
-50°C ±0.040°C
-20°C ±0.035°C
0°C ±0.030°C
100°C ±0.035°C
350°C ±0.050°C
(Calibrations down to -196°C available upon request.)

Accessories

FWSP350I	425°C Working Std 1/4" PRT

CH-5

The CH-5 Chiller Unit

The CH-5 Chiller Unit is designed for use in conjunction with the TECAL 140 H&S Calibrators to achieve calibration temperatures down to -40°C. Chilled water pumped through the Heatsinks on the Tecal 140 units to allow the Tecal to reach -40°C.

In normal ambient temperatures of up to 20°C the minimum temperature obtainable with the TECAL 140 models is 45°C below ambient; by artificially cooling the heatsink of the units with water from the chiller -40°C can be obtained.

The unit is designed to run on distilled or deionised water.

The CH-5 can also be used to pass cooling water through the cooling coil on the Calibration Baths (LCB) and Cooling Probe (FDB00CP); minimum temperature +10°C.

Technical Data

Temperature	
Working temperature range	4°C to 15°C
Cooling capacity	400W
Temperature control	Thermostat on/off
Electrical control	Manual
Dimensions (external)	
Length	430mm
Width	235mm
Height (including pump)	524mm
Bath size:	
Length	300mm
Width	140mm
Bath depth	150mm
Bath capacity	5 litres
Pump capacity	20 litres/minute
Pump head	6 metres with water
Net weight	26.5kg

Ordering Information

Product Code	Model	Voltage	Hz	Watts	Shipping Weight (kg)
FCH5H	CH-5	230	50/60	320	26.5
FCH5A	CH-5	120	50/60	320	26.5

Liquid Temperature Calibration Baths

Water Baths

A comprehensive range of temperature controlled water baths are available from Techne. Twenty different water bath combinations allow the use of accurate temperatures from -40°C up to 200°C; ensuring a solution for most laboratory applications.

First select the unheated stainless steel bath (see page 23) which has the appropriate volume for the application, for example B-26 which has a volume of 26 litres.

Then add a thermoregulator (see page 24-25) which is suitable for the required temperature range, for example the TE-10D Tempette is a digital thermoregulator for temperatures between -40°C and 120°C.

Select any accessories that are required, for example; both gabled and flat lids are available for all bath sizes. Gabled lids allow particularly tall tubes to be accommodated.

If sub-ambient temperatures are required it is necessary to add a cooling mechanism to the bath. Techne recommends the use of a dip or flow cooler for temperatures down to -35°C. For example the RU-200 can lower temperatures down to -20°C. It is also possible to use the cooling coil with a water supply for temperatures from 5°C above the water temperature to ambient.

To assemble the complete system shown opposite the following products are required:

Product Code	Description
FBATH26	B-26 stainless steel bath, 26 litre capacity
FTE10DDC	TE-10D, digital thermoregulator
FFLAT18	Flat lid for 18 or 26 litre bath
FRU2D	RU-200 dip cooler

Unheated Baths

Designed to be used with a clip-on Tempette or Tempunit® thermoregulator, these baths incorporate carrying handles for added safety. All baths have stoved enameled steel outer cases and are supplied with bridge mounting plate to hold the thermoregulator.

Polypropylene spheres can be used to create a ball blanket so as to reduce evaporation and heat loss, whilst providing instant access to the bath.

B-8

Four bath capacities – 8, 12, 18 and 26 litre

- Stainless steel construction
- Seam-free and corrosion resistant stainless steel inners for easy cleaning
- Rugged splash-proof case
- Integrated carrying handle
- Maximum working temperature of 200°C
- All models come with a 3 year warranty as standard

B-12

48 litre

- 48 litres capacity
- Welded construction
- All submerged parts are made from stainless steel
- Rugged splash-proof case
- Maximum working temperature of 200°C

Technical Specification

Capacity litres		8	12	18	26	48
Dimensions (mm)	Length	265	354	530	530	594
	Width	325	325	325	325	365
	Height	172	172	172	222	298
Internal Dimensions (mm)	Length	240	329	505	505	559
	Width	300	300	300	300	330
	Height	150	150	150	200	274
Top of bath to liquid level max depth (mm)		65	65	65	65	65
Working length to thermoregulator (mm)		115	205	380	380	430
Working depth - max/min (mm)		130/100	130/100	130/100	180/150	255/224
Working capacity - max/min (litres)		8.0/6.0	11.6/8.4	18.0/13.2	26.0/20.5	48.5/42.5

B-18

For temperatures up to 250°C we recommend the use of the LCB range of baths.

Ordering Information

Product Code	Description
FBATH08	B-8 stainless steel bath, 8 litre capacity
FBATH12	B-12 stainless steel bath, 12 litre capacity
FBATH18	B-18 stainless steel bath, 18 litre capacity
FBATH26	B-26 stainless steel bath, 26 litre capacity
FBATH48	B-48 stainless steel bath, 48 litre capacity

B-48

Techne® invented the "Clip On" thermoregulator in 1948, and now offer four "Clip On" units. Thermoregulators are designed to be used with the Techne® unheated water baths or any other suitable laboratory vessels. They will heat, circulate and safely control the temperature of the liquid in the bath within precise limits.

Stability ±0.01°C

TE-10A

TE-10A Tempette

- Temperature range of -20°C* to 95°C
- Excellent temperature stability: ±0.01°C at 40°C
- Simple to use analogue control
- Suitable for most routine laboratory applications
- User adjustable over-temperature cut-out for unbeatable safety

TE-10D Tempette

- Temperature range of -40°C* to 120°C
- Excellent temperature stability: ±0.01°C at 40°C
- 4 digit setting with a bright LED digital temperature display
- Suitable for most routine laboratory applications
- User adjustable over-temperature cut-out
- Low liquid level cut-out as standard

Technical Specification

Specifications to DIN 12876	TE-10A	TE-10D
Temperature range*	-20°C to +95°C	-40°C to +120°C
Temperature selection	Analogue	Digital
Temperature stability using water @ 40°C	±0.01°C	±0.01°C
Method of control	Proportional	PID
Temperature sensor	Thermistor	PRT
Adjustable over-temperature cut-out	Yes	Yes
Low liquid level cut-out	Yes	Yes
Heating/Pumping		
Nominal heater power at 120V (W)	1000	1000
Nominal heater power at 240V (W)	1000	1000
Pump capacity litres/minute	10	10
Pump capacity (mbar)	145	145
Dimensions		
Extension below base (mm)	145	145
Dimensions L x W x H (mm)	237 x 124 x 260	237 x 124 x 260

* Refrigeration or cooling coil required for below ambient cooling (see Flow and Dip Coolers and the cooling coil).

Stability ±0.01°C

TE-10D

Cooling coil

Connects to the mains water supply; the water being circulated through the coil should be at least 5°C cooler than the set of the bath temperature. (Fits to any TE or TU unit).

Ordering information

Product Code	Description
FTE10ADC	TE-10A, analogue thermoregulator, -20°C to 95°C, supplied with clamp)
FTE10DDC	TE-10D, digital thermoregulator, -40°C to 120°C, (supplied with clamp)
FCC01	Cooling Coil

TU-20D Tempunit®

- A wider temperature range of -40°C* to 200°C
- Excellent temperature stability: ±0.005°C at 40°C
- 1.8kW heater power for fast heat up
- 4 digit setting with a bright LED digital temperature display
- This unit incorporates an RS232 connection
- User adjustable over-temperature cut-out
- Low liquid level cut-out as standard

TU-20HT Tempunit®

- This sophisticated Tempunit® covers a wide temperature range of -40°C* to 250°C
- Excellent temperature stability: ±0.005°C at 40°C
- 1.8kW heater power for fast heat up
- 4 digit setting with a bright LED digital temperature display
- RS232 connection supplied with TechneWorks software package and connecting lead as standard
- User adjustable over-temperature cut-out with an audible alarm fitted
- Low liquid level cut-out as standard

TU-20D

Technical Specification

Specifications to DIN 12876	TU-20D	TU-20HT
Temperature range *	-40°C to +200°C	-40°C to +250°C
Temperature selection	Digital	Digital
Temperature stability using water @ 40°C	±0.005°C	±0.005°C
Method of control	PID	PID
Temperature sensor	PRT	PRT
Adjustable over-temperature cut-out	Yes	Yes
Low liquid level cut-out	Yes	Yes
PC Interface	Yes RS232	Yes RS232
Heating/Pumping		
Pump capacity litres/minute	10	N/A internal circulation only
Pump capacity (mbar)	145	-
Nominal heater power at 120V (W)	1500	1500
Nominal heater power at 240V (W)	1800	1800
Cooling coil	Option	Option
Extension below base (mm)	145	145
Dimensions L x W x H (mm)	237 x 124 x 260	237 x 124 x 260
TechneWorks software package	TechneWorks#	TechneWorks#

* Refrigeration or cooling coil required for below ambient cooling (see Techne Flow and Dip Coolers and the cooling coil). The TU-20HT can only be used with the Dip Coolers.

(See page 11 for details)

TU-20HT

Ordering Information

Product Code	Description
FTU20DDC	TU-20D, advanced thermoregulator with RS232, -40°C to 200°C, (supplied with clamp)
FTU20HDC	TU-20HT, advanced high temperature thermoregulator with RS232 and Techneworks software, -40°C to +250°C, (supplied with clamp)
FCCO1	Cooling Coil

Dip and Flow Coolers

RU-200 and RU-500 models

The Techne Dip and Flow Coolers work in conjunction with a Techne thermoregulator (see pages 24 and 25). The bath liquid flows through the unit which continually extracts heat from the bath fluid by means of the heat exchanger which is built into the unit. The cooling head of the Techne Dip Cooler fits neatly and unobtrusively into the corner of the bath and can be secured with a specially designed mounting bracket (supplied).

Techne Dip and Flow coolers are designed for use when ambient temperatures down to -35°C are required.

- Four models
- Compact refrigeration units for achieving temperatures down to -35°C*
- Cooling head of the Dip Cooler fits neatly into the corner of a Techne liquid bath (RU Series Dip Coolers)
- Designed for use with Techne liquid baths

Technical Specification

Cooling (at 20°C ambient)		FC-200	FC-500	RU-200	RU-500
Minimum achievable temperature		-20 °C	-35 °C	-20 °C	-35 °C
Cooling capacity: 20°C (Watts)		140W	210W	145W	240W
Cooling capacity: 0°C (Watts)		140W	210W	145W	240W
Cooling capacity: -10°C (Watts)		110W	200W	110W	230W
Internal capacity (ml)		200ml	200ml	–	–
Nominal dimensions					
(excluding handles/coil) Overall (mm) -	width	235	370	235	370
	length	420	430	420	430
	height	300	325	300	325
Coil dimensions (mm)	length	–	–	85	85
	diameter	–	–	75	75
Hose length to coil (mm)		–	–	1250	1250
Shipping weight		19	39	19	39

*At an ambient of 20°C, using a mixture of 40% water, 40% antifreeze and 20% ethanol

Ordering Information

Model#	Product Code	Description
Circulators and flow coolers		
FC-200	FFC2D	FC-200 flow cooler, -20°C
FC-500	FFC5D	FC-500 flow cooler, -35°C
Dip coolers		
RU-200	FRU2D	RU-200 dip cooler, -20°C
RU-500	FRU5D	RU-500 dip cooler, -35°C

FC-200

Refrigerated Baths

These baths are a complete refrigerated circulating system for open or closed applications for temperature ranges from -35°C to 100°C. Each bath is supplied with a lid and bridging plate.

There are three bath capacities: 7 litre (RB-5A), 12 litre (RB-12A) and 22 litre (RB-22A). Temperature control is via one of the four thermoregulators and together they offer a choice of 12 different bath combinations.

- Circulating bath with built in refrigeration
- Temperature range from -35°C to 100°C
- Three different capacities of refrigerated bath; 7, 12 or 22 litre
- The combination of 3 circulating baths and 4 thermoregulators provides 12 options

RB-12A

Technical Specification

Cooling (at 20°C ambient)	RB-5A	RB-12A	RB-22A
Minimum achievable temperature[1]	-20°C	-35°C	-30°C
Cooling capacity at 20°C	145W	240W	240W
Cooling capacity at 0°C	145W	240W	240W
Cooling capacity at -10°C	110W	230W	220W
Dimensions			
Overall Size - L x W x H (mm)[2]	430 x 250 x 566	430 x 370 x 610	430 x 395 x 565
Liquid surface to top of bath - max (mm)	65	65	65
Internal dimensions - L x W x H (mm)	192 x 151 x 200	208 x 300 x 150	360 x 295 x 220
Working length to thermoregulator (mm)	224	224	250
Working depth - max/min (mm)	180/135	130/85	200/160
Working capacity - max/min (litres)	7.0/5.5	11.6/9.6	22/18
Shipping weight kg[3]	31	53	61

[1] Using a mixture of 50% of water and 50% antifreeze to achieve -20°C.
Alternatively 40% water, 40% antifreeze, 20% alcohol to achieve -35°C.

[2] Overall size with controller

[3] Add thermoregulator and bath shipping weight to get shipping weight of complete bath system.

RB-5A

Ordering Information

Product Code	Description
FRB5D	RB-5A bath, 7 litre capacity with built in refrigeration unit, -20°C to 100°C
FRB2D	RB-12A bath, 12 litre capacity with built in refrigeration unit, -35°C to 100°C
FRB22D	RB-22A bath, 22 litre capacity with built in refrigeration unit, -30°C to 100°C

Liquid Calibration Baths

The Techne liquid calibration bath (LCB) series offer compact, accurate and reliable liquid baths which can be used for external circulation or temperature calibration of thermal sensors.

- -35°C to 250°C
- Three different capacities available; 5, 7 or 12 litres
- Temperature stability; ±0.005°C depending on choice of control unit
- Fully insulated bath for excellent heat retention
- Analogue or digital temperature selection, depending on choice of control unit
- Includes cover, lid and bridging plate

When temperature calibration is required the compact liquid baths offers excellent stability over the entire temperature range. The LCBs can be also be used for external circulation to maintain temperatures of samples in viscometers, photometers, refractometers, fermenters and other reaction vessels.

All models of LCB offer exceptional thermal stability from -35°C to 250°C. The baths are fully insulated on all sides and base and are fitted with a cooling coil for connection to a cold water supply for use at temperatures around ambient. The minimum temperature achievable is -35°C when a Dip or Flow Cooler is added to the system.* For the full specifications of the thermoregulators see pages 24 and 25.

Each bath is supplied complete with lid, drain tap, carry handles , a cooling coil and hole with bung to position a certified sensor.

The TechneWorks software package is available for the TU-20 thermoregulators free of charge from www.techne.com (see page 11 for details).

Technical Specification

	5 litre	7 litre	12 litre
Working depth L x W x H (mm)	125	175	300
Dimensions L x W x H (mm)	351 x 260 x 183	351 x 260 x 233	351 x 260 x 358
Thermoregulator L x W x H (mm)	237 x 124 x 260	237 x 124 x 260	237 x 124 x 260
Bath opening (mm)	140 x 140	140 x 140	140 x 140

Ordering Information

Product Code	Description
FBCAL05D	LCB insulated liquid calibration bath with cooling coil, 5 litre capacity
FBCAL07D	LCB insulated liquid calibration bath with cooling coil, 7 litre capacity
FBCAL12D	LCB insulated liquid calibration bath with cooling coil, 12 litre capacity

*LCB baths fitted with a TU-20HT thermoregulator are not suitable for use with a Flow Cooler.

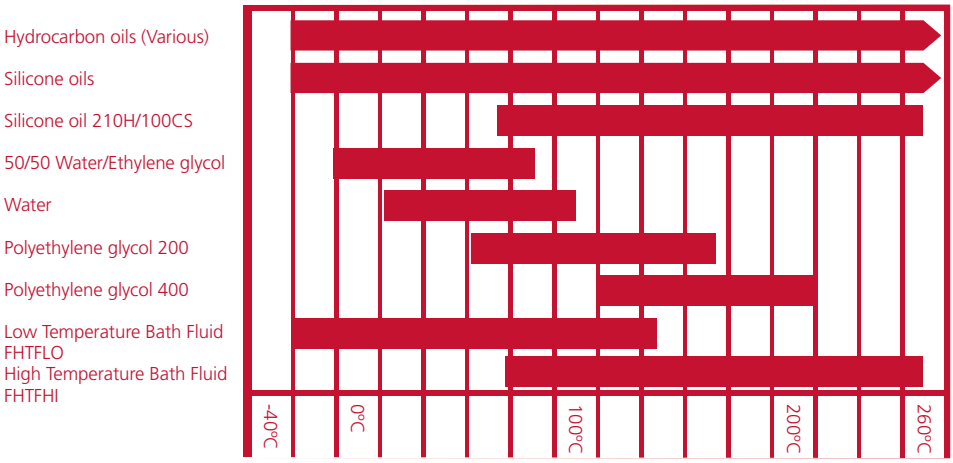
Liquid Calibration Bath	LCB-5/7/12	LCB-5/7/12
Thermoregulator	/TU-20D	/TU-20HT
Bath Capacity	5 / 7 /12 litres	5 / 7 / 12 litres
Operating temperature range[1]	-35 to 200°C	ambient +10 to 250°C
Working temperature range[2]	25 to 200°C	30 to 250°C
Stability at -35°C (short term*)	+/-0.015	N/A
Stability at 0°C (short term*)	+/-0.020	N/A
Stability at 50°C (short term*)	+/-0.005	+/-0.005
Stability at 100°C (short term*)	+/-0.015	+/-0.015
Stability at 200°C (short term*)	+/-0.024	+/-0.024
Stability at 250°C (short term*)	N/A	+/-0.040
Uniformity °C (full range**)	0.008	0.008
Accuracy °C (full range)	+/-0.5	+/-0.5

1) With an FC-500 flow cooler;
2) ambient of 20°C
*Short term stability is over a 15 minute period, for 1 hour double the values shown

**Two SPRT's 3" apart in the working area of bath

Choice of liquids

Some liquids can be hazardous when used in thermostatic baths. The user should ensure that due regard is paid to the flash-point and other characteristics of the chosen liquid. This table does not represent the recommendations of Techne but may be of assistance to the user in making an initial selection.



Liquid Bath Accessories

Cooling coil

Connects to the mains water supply; the water being circulated through the coil should be at least 5°C cooler than the set of the bath temperature. (Fits to any TE or TU unit).

Flat and gabled lids

Manufactured of stainless steel and available to fit all sizes of temperature controlled bath to help prevent evaporation losses. Gabled lids provide extra working headroom within the bath.

Adjustable trays

Supported by a ball chain and clip the stainless steel trays can be used to alter the depth of the bath.

Polypropylene spheres

A ball blanket is an effective way of reducing evaporation and loss of heat from a water bath. It acts as effectively as a lid, whilst providing instant access to the bath. The 25mm diameter spheres are supplied in packs of 250.

Ordering Information

Flat Lids	**Description**
FFLAT08	8 litre size
FFLAT12	12 litre size
FFLAT18	18 and 26 litre size
FFLAT48	48 litre size
Gabled Lids	
FGABLE08	8 litre size
FGABLE12	12 litre size
FGABLE18	18 and 26 litre size
FGABLE48	48 litre size
Adjustable Trays	
FADJ08	8 litre size
FADJ12	12 litre size
FADJ18	18 litre size
FADJ26	26 litre size
FADJ48	48 litre size
Accessories	
FTWORKS	TechneWorks CD-ROM
F840D	Polypropylene spheres, 250x25mm diameter

Heat transfer Fluid - High Temperature

This high temperature fluid offers industry a practically non-toxic, versatile bath fluid that has proven to be cost effective and thermally stable at temperatures up to +315°C. This fluid has demonstrated excellent performance over a wide range of temperature without compromising economics or system integrity. Unlike the less stable mineral oil based fluid, our high temperature fluid provides the user with the confidence and reliability without the premium price of other fluids. Recommended temperature range +60 to +250°C.

- Benefits and features
- Low viscosity
- Improves bath uniformity and stability
- Enhanced heat-up and cool down rates
- Lower cost than glycol and silicone oil type fluids
- Safe and non-toxic
- Convenient 18 Litre (5 US gallon) containers

This fluid is not for long term (more than a few hours) continuous use above 100°C as excessive oxidation will occur.

As with most high temperature fluids, a fume hood is recommended for operating temperatures above 150°C.

This fluid should only be used with the following plastics; ABS, Epoxy, Acetal, Viton, Kalrez, Chemraz, Fiberglass, Graphites, Fluroelastimers.

For all other plastic types contact Techne for specific recommendations.

Technical Information

Typical Properties – High Temperature bath fluid Catalog # FHTFHI	
Appearance	Clear, Light brown, oily liquid.
Boiling point	>330°C/626°F
Composition	Synthetic organic hydrocarbon based liquid
Fire point	210°C/410°F
Flash point	180°C/356°F
Auto ignition temperature	330°C/626°F
Specific heat	~0.50 Btu/ (lb) (°F) @ 50°C (122°F)
Viscosity	12cP @ 50°C
Minimum pumpability limit	0°C/32°F
Odour	Bland
Volumetric Expansion from 0°C to 300°C	30.5%
Thermal conductivity at 20°C/68°F	0.135 W/m.K (0.078 Btu/ft. hr. °F)
Recommended use range	60°C to 250°C (122°F to 482°F)

Techne high temperature bath fluid or its vapour, like many other heat transfer fluids, may ignite if released into the environment and exposed to hot surfaces, sparks, open flames, or other source of ignition.

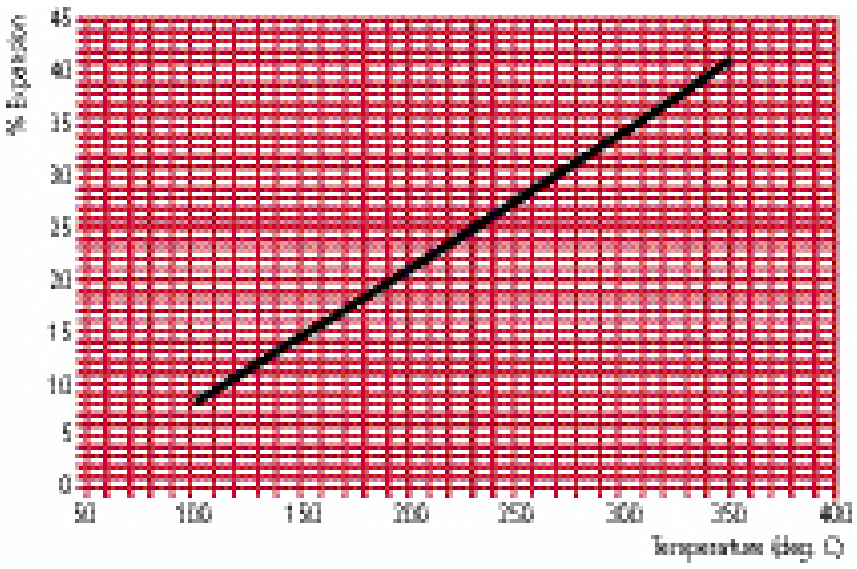
Ordering Information

FHTFHI	18 litre size

Physical and Chemical Properties

Temperature		Density		Specific Heat		Thermal Conductivity		Viscosity		Vapour Pressure	
°C	°F	kg/m³	lb/ft³	J9⁻¹ K⁻¹	Btu.lb⁻¹.°F⁻¹	W/m.K	Btuhr⁻¹.ft⁻¹.°F⁻¹	cP	cSt	KPa	psi
-20	-4	904	55.5	1.82	0.435	0.137	0.079	720	796	-	-
0	32	890	55.6	1.89	0.451	0.136	0.078	160	180	-	-
20	68	877	54.7	1.97	0.471	0.135	0.077	37	40	-	-
40	104	863	53.9	1.97	0.487	0.134	0.007	17	20	-	-
60	140	850	53.1	2.11	0.504	0.132	0.076	8.0	9.4	-	-
80	176	836	52.1	2.19	0.523	0.130	0.075	4.4	5.3	-	-
100	212	823	51.4	2.26	0.540	0.129	0.074	2.8	3.4	-	-
120	248	810	50.6	2.33	0.557	0.127	0.073	1.9	1.8	-	-
140	284	796	49.7	2.41	0.576	0.125	0.072	1.4	1.8	-	-
160	320	783	48.9	2.48	0.592	0.124	0.071	1.1	1.4	0.138	0.02
180	356	769	48.1	2.55	0.609	0.122	0.070	0.85	1.1	0.345	0.05
200	392	755	47.1	2.62	0.626	0.121	0.070	0.66	0.87	0.897	0.13
220	428	743	46.3	2.70	0.645	0.119	0.068	0.54	0.73	2.00	0.29
240	464	729	45.5	2.77	0.662	0.118	0.068	0.44	0.60	4.00	0.58
260	500	716	44.8	2.84	0.678	0.116	0.067	0.36	0.50	7.66	1.11
280	536	702	43.8	2.92	0.697	0.114	0.066	0.30	0.43	13.79	2.00
300	572	688	43.0	2.99	0.714	0.112	0.064	0.26	0.38	23.52	3.41

Temperature		Coefficient of Thermal Expansion		Volume Thermal Expansion
°C	°F	(10³/K)	(10³/R)	%
0	32	-	-	-
100	212	0.790	0.439	7.9
150	302	0.942	0.532	14.1
200	392	0.900	0.500	18
250	482	1.004	0.558	25.1
300	572	1.063	0.591	31.9
350	662	1.183	0.657	41.4



Heat Transfer Fluid - Low Temperature

The low temperature heat transfer fluid is engineered to offer non-toxic and low odour qualities at an affordable price.

This fluid will satisfy the expectations of the most demanding modern day customer by providing an environmentally sound, thermally effective heat transfer fluid with a flash point of greater than 61°C (141°F) or greater. The fluid offers a low viscosity rating and unequalled heat transfer characteristics through its entire operating temperature range. Recommended temperature range -40°C to 125°C.

When operator safety, environmental impact and price set the benchmark for your next open bath or closed loop heat transfer application, consider FHTFLO.

A fume hood is recommended for open baths being operated at temperatures above +50°C

- Benefits and features
- Low viscosity
- Improves bath uniformity and stability
- Enhanced heat-up and cool down rates
- Lower cost than glycol and silicone oil type fluids
- Safe and non-toxic

Convenient 18 Litre (5 US gallon) containers

NOTE: This fluid should only be used with the following plastics; Acetal, Aramid Fiber, Chemraz (FFKM), Epoxy, Fluorocarbon (Film), Flouroelastimer, Glass Fibre, Gylon style 3500,3504 & 3510, Kalrez, Kel-F (CTFE), PEEK, Polytetrafluor-ethylene, PTFE Encapsulated Silicone, PTFE Encapsulated Viton, PTFE Impregnated Fibreglass, Viton, Resin Impregnated Carbon Graphite.

Metal Compatibility; Aluminium, Brass, Bronze, Carbon Steel, Cast Steel, Copper, Copper Nickel, Hasteloy, Inconel, Monel, Nickel, Stainless Steel, Tantalum, Titanium.

For all other material types contact Techne for specific recommendations.

Technical Information

Typical Properties – Low Temperature bath fluid Catalog # FHTFLO	
Appearance	Transparent, clear.
Boiling point	>191°C / >376°F
Composition	Aliphatic hydrocarbon blend
Fire point	72°C / 162°F
Flash point (Closed cup)	>61°C / >141°F
Flash point (Open cup)	68.8°C / 156°F
Auto ignition temperature	>337°C / >640°F
Critical temperature (estimated)	394°C / 741°F
Critical pressure (estimated)	27bar / 26.7 atm
Average molecular weight	150
Dielectric constant	2.1-2.2
Thermal conductivity at 0°C/68°F	0.1126 W/m.K (0.0668 Btu/(hr)(ft2) (°F/ft)
Recommended temp. range open system	-52°C to 58°C (-60°F to 135°F)
Recommended temp. range closed system	-73°C to 177°C (-100°F to 350F)

1 Techne high temperature bath fluid or its vapor, like many other heat transfer fluids, may ignite if released into the environment and exposed to hot surfaces, sparks, open flames, or other source of ignition.

Ordering Information

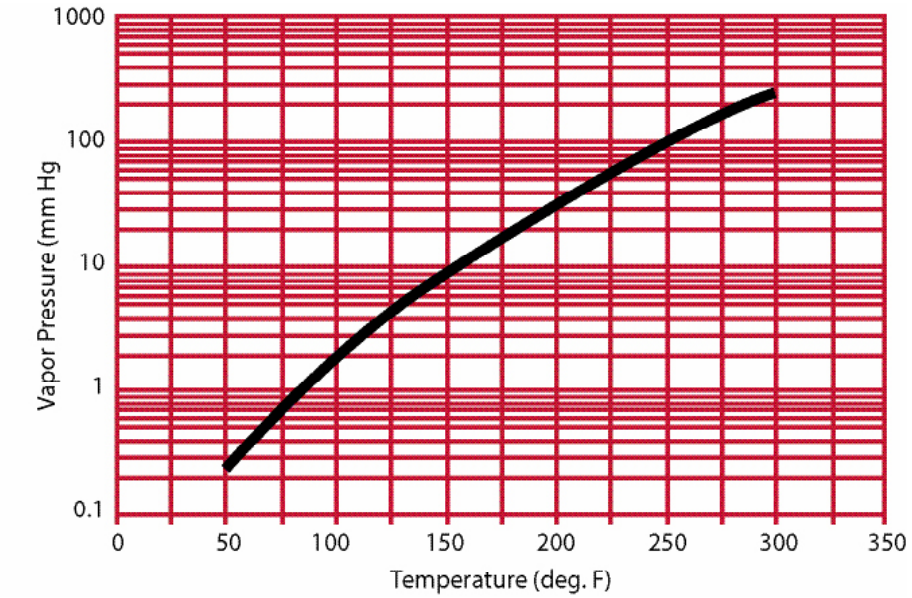
FHTFLO	18 litre size

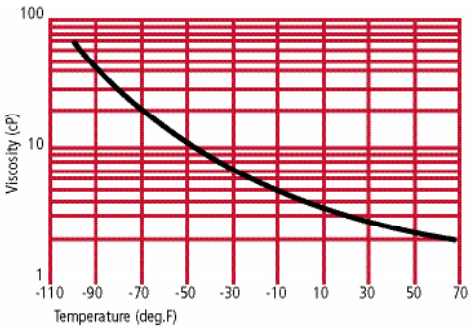
US Units

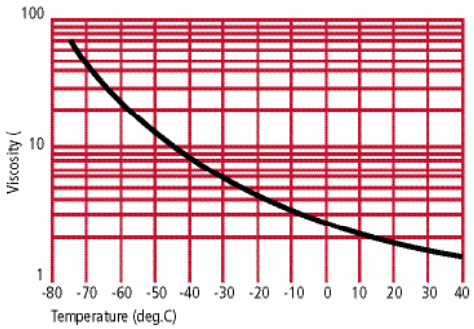
Temp °F	Density lb/ft³	Sepecific Heat Btu/lb avvvF	Thermal Conductivity Btu/(hr)(ft²)(°F/ft)
-80	51.49	0.4266	0.0708
-40	50.44	0.4466	0.0688
0	49.38	0.4666	0.0688
40	48.33	0.4686	0.0648
80	47.28	0.5266	0.0628
120	46.23	0.5266	0.0608
160	45.18	0.5466	0.0588

SI Units

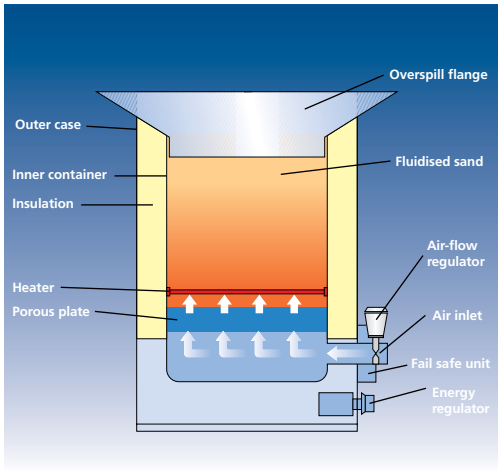
Temp °C	Density kg/m³	Sepecific Heat kJ/kg K	Thermal Conductivity W/m K
-75	834.5	1.7342	0.1276
-50	815.5	1.8292	0.1226
-25	796.5	1.9242	0.1176
0	777.6	2.0192	0.1126
25	758.6	2.1192	0.1706
50	739.6	2.2092	0.1026
75	720.6	2.3042	0.0976







Precision Temperature Fluidised Sand Baths



Precision Temperature Fluidised Sand Baths

With more than 50 years experience in the field of temperature control, Techne has established itself as a world leader in the design and manufacture of equipment used for both laboratory and on-site temperature calibration, providing the calibration engineer with a precise dynamic stable temperature source.

Exceptional temperature stability and uniformity also make Techne fluidised baths the ideal choice for critical heat treatment procedures.

Pioneers in the development of fluidised bath technology, Techne have a wide range of products capable of covering the temperature range –100°C to 1100°C.

The fluidised bath is constructed from a container filled with dry inert particles of aluminium oxide. When a gas flow is passed through the particles via a porous distribution plate, the particles are separated and suspended in the gas flow and give the appearance of a boiling liquid.

Apart from circulating and flowing like a liquid, fluidised particles exhibit excellent heat transfer characteristics. When fluidised particles are heated, heat is distributed quickly and evenly throughout the bath and transferred rapidly to objects submerged in the bath. The bath temperature can be adjusted easily to the point at which you wish to calibrate or carry out a heat treatment application.

Within the temperature range of the unit the aluminium oxide does not melt or reach boiling point. Therefore, solidification which takes place in salt baths and fumes from hot oil baths are eliminated.

Fluidised baths are dry and inert, making the medium a safe and clean alternative to conventional liquid systems and salt baths.

Techne fluidised baths are used in materials and component quality control, instrument calibration laboratories and thermal processing production departments. They provide rapid heat transfer and precise temperature control to calibrate and maintain temperature sensitive instruments efficiently and safely.

Applications include:-

Aerospace

- Jet engine sensors particularly irregularly shaped sensors which cannot be calibrated with Dri-Block or liquid baths.
- Wiring looms from battery and engine sensors on transport aircraft.

Fuel cells systems

- Heat source for a heating coil used to generate superheated steam which is a safer alternative to electric ovens and oil baths.

Engineering

- Heat treatment of metals used in stress analysis testing.
- Heating of reactor vessels containing plastics samples.

Mining

- Used to heat a reactor vessel with mineral samples when investigation oil and petroleum generation.

Petrochemical

- Used to test heavy ship oil in reactor vessels.

Shape setting

- Used by leading manufacturers to shape- set nitinol stents and platinum/tungsten coils.

SBL Range

The SBL range of Fluidised Baths offer a safer alternative to the dangers associated with high temperature oil and salt baths.

These units are designed to be bench or floor standing and only require an electrical and air supply for operation. Air passes through the mass of the aluminium oxide (Alundum) particles via a porous plate in the base of the unit separating the individual particles and suspending them in free air, giving the properties of a liquid bath. Heaters are fitted within the bath which allow temperatures of up to 600°C to be maintained. All the SBL range units have a stainless steel inner container insulated from the outer wall and a safety air pressure switch in the event of loss of air and also a thermal cut-out. A range of accessories are available.

All SBL units can have their temperature accuracy (and setability) improved by fitting the optional TC-8D temperature control unit (see page 38) which will maintain the temperature to within ±0.3°C.

SBL-1

SBL-1

With a temperature range of up to 350°C this unit covers a wide range of applications.

Simple to operate and maintenance free the SBL-1 Fluidised Bath provides a uniform and stable heat source and will control the temperature to within ±1°C.

The SBL-1 has a working volume of 228mm diameter and 120mm deep. The unit is fitted as standard with an energy regulator to set and control the temperature. Selector switches are used to add or reduce power when required with neons illuminating when power is applied to each of the two heating elements.

Technical Information

	SBL-1
Temperature range °C	50 to 350
Temperature stability °C, @ 50°C	±1
Heat up time, minutes	
20°C to maximum	60
Cooling time, minutes	
from maximum to 200°C	150
Air pressure, kPa (psi)	21(3)
Air flow, maximum litres/minute	57
Weight of medium, required (kg) supplied with unit (kg)	13 (25kg)
Overall size, mm	
Diameter (excluding tap)	315
Height	470
Working volume, mm	
Diameter	228
Depth	120

Ordering Information

Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, kg
SBL-1	F940H	240*	50/60	2000	30

* SBL-1 is also available as 120V unit)

SBL-2

SBL-2

For temperatures up to 600°C the SBL-2 Fluidised Bath will maintain temperature to within ±1°C. The working volume of the unit is 228mm diameter and 140mm deep. Three 1kW heaters give a heat up time from ambient to 600°C of approximately 100 minutes. (All the SBL range of units have a pocket in the fluidised bath that will accept a 5mm diameter control thermocouple.)

SBL-2D

This extra depth fluidised bath is based on the SBL-2 but with an increased working depth of 350mm. Four 1kW heaters give a heat up time from ambient to 600°C of approximately 100 minutes.

SBL-2D

TC-8D & RS-232

Designed to improve the temperature stability and temperature setting accuracies the TC-8D is compatible with all of the SBL series of fluidised baths.

The TC-8D is a self contained unit and is supplied complete with a chromel/alumel Type K thermocouple which fits into the sheath supplied with the SBL baths.

The unit has digital set point of bath temperature on an LED display with PID control.

A TC-8D with RS-232 communication is also available for use with our custom iTools software for programming ramps, dwells and hold at up to 10 temperature set points.

Technical Information

	SBL-2	SBL-2D	TC-8D
Temperature range °C	50 to 600	50 to 600	0 to 630
Temperature stability °C, @ 50°C	±1	±1	±0.3
Heat up time, minutes			
20°C to maximum	105	105	-
Cooling time, minutes			
from maximum to 200°C	300	330	-
Air pressure, kPa (psi)	21(3)	21(3)	-
Air flow, maximum			
litres/minute	57	57	-
Weight of medium, required (kg)	16	32	
Supplied with unit (kg)	25	50	-
Overall size, mm			
Diameter (excluding tap)	385	385	Width 165
Height	470	695	Depth 240
			Height 140
Working volume, mm			
Diameter	228	228	-
Depth	140	350	-

Ordering Information

Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, kg
SBL-2	F945H	240	50/60	3000	39
SBL-2D	F946H	240	50/60	4000	59
TC-8D	F937C	120/240	50/60	-	3.1

TC-8D

TechneWorks software

This custom software allows programs to be easily created and sent to the FB-08C and also the TC-8D with RS-232. It has been specially written to enable easy programming of the controller.

FB-08 Range

The FB-08 series are precision fluidised baths with exceptional temperature stability and uniformity making them the ideal choice for critical temperature calibration and heat treatment processes. The characteristics of the FB-08 series offer excellent thermal uniformity and heat transfer to make them a useful tool in the calibration and testing of a very wide range of temperature sensors.

These FB-08 and FB-08C Fluidised sand baths have become the market standard for carrying out shape setting (heat treatment processing) on Nitinol wire in a precisely controlled and uniform manner. Platinum/tungsten products are now also being processed successfully. The Fluidised baths offer lower running costs and are much safer to use than the alternative salt baths and give much better results than conventional ovens. These products have excellent temperature uniformity and offer fast temperature immersions as the fluidised alumina behaves like a liquid. The typical processing time is typically 2-3 minutes per item for immersion in the bath which is then followed by quenching in a cold fluid.

The unit is suitable for many other applications including thermal testing of sensitive components such as semiconductor devices, wire product testing, delicate transducers and they may also be used as a constant temperature environment for chemical reactions.
Because the fluidised bed is a fine dry powder, it does not have surface tension effects of liquid baths, and does not wet any objects immersed in it. The electrical insulating properties of the alumina used in the FB-08 series are not affected by fluidisation, making it possible to conduct electrical measurements on immersed objects such as assembled printed circuit boards.

FB-08

- Temperature range 50°C to 700°C
- Temperature stability, as good as ±0.2°C
- Working volume diameter x depth, 165 x 385mm
- PID temperature control
- Digital temperature indication
- Digital temperature set point

FB-08C

Controls for temperature and fluidising air flow are mounted on a recessed panel on the front of the unit together with on-off switches for the power supply and the dust extraction system. The inner container is well insulated and the outer case is vented so that it remains safe and cool to the touch even when the bath is operating at its maximum temperature. The inner container is filled from the top with alumina. When fluidised the alumina is heated by the four immersion heaters close to the inner container outer wall with the control thermocouple giving excellent temperature control.

The heater elements are protected (by a pressure switch operated by the fluidising air) from excessive surface temperatures and the power supply is removed if the air supply to the unit is disrupted. The unit also has an over-temperature cut-out fitted to protect the heating elements if a fault with the control system occurs. Air supplied to the unit passes through two filters and a pressure regulator to remove any oil and moisture and to set the correct pressure for the cyclone extraction system and for optimum fluidisation.

The fluidising air passes through a flowmeter and then to a plenum chamber from which it is distributed evenly across the inner container.

Dust extraction is carried out by ambient air being drawn down past the probe plate and through a peripheral slot around the top edge of the inner container. It then passes through a cyclone to separate and remove any alumina particles which are collected in a glass collection jar and then passes through the exhaust filter.

Entrained alumina removed by the cyclone and collected in the collection jar, which is accessible from the front of the unit, can be re-used and simply emptied back into the bath.

Sensor calibration or precision heat treatment is simple and precise with the FB-08 series fluidised baths.

FB-08LT

- Set the bath to the required temperature and air flow level (on manual units).
- Suspend the sensor to be tested in the bath (using the probe plate supplied or basket) in the working area and allow the bath to stabilise for a short period.
- Calibration or heat treatment can now be carried out using either a certificated standard (Comparison method) or the readout from the FB-08 control unit (direct method).

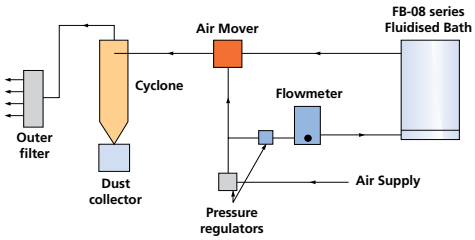
Other inert gasses can be used for special applications provided appropriate precautions are taken.

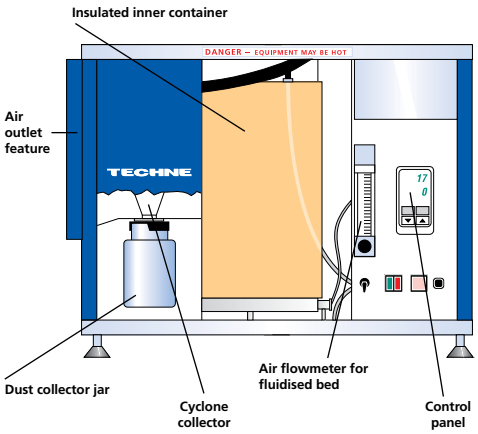
FB-08

FB-08, Fluidised Bath

The FB-08 series Fluidised Baths are precision baths with exceptional temperature stability and uniformity and are a safe and clean alternative to conventional liquid systems and salt baths. The fumes from oil and salt baths and also the dangers in placing components with moisture on into the bath are eliminated.

In operation, first set the flow of fluidising air by means of the control valve on the flowmeter. The setting will vary depending on the operating temperature; at higher temperatures a lower flow rate is required for good fluidisation. Select the required operating temperature on the temperature controller. The digital display indicates the set point value and the actual bath temperature. Sensors for calibration should be suspended as close as possible to the centre of the working area or for increased uniformity by using a probe holder.





Technical Information

	FB-08
Temperature range °C	50 to 700
Temperature stability °C	
Short term @ 50°C	±0.2
Short term @ 600°C	±0.3
Long term @ 50°C	±0.5
Long term @ 600°C	±0.5
Display resolution °C	1
Type of Control	3 term (PID)
Sensor type	K Chromel/alumel thermocouple
Heat up time, minutes 20°C to 700°C	105
Cooling time, minutes 700°C to 200°C	165
Air pressure, kPa (psi)	420 (60)
Maximum flow, litres/minute	127
Weight of medium, kg	16
Overall size L x W x H, mm	770 x 515 x 600
Working volume Diameter x Depth, mm	165 x 385

3208L Eurotherm FB-08 Controller

The Eurotherm controller includes PID controls, digital set and readout of the bath temperature. Power is switched via a solid state relay. Individual indicators show manual mode, setpoint and output status. The controller is password protected to allow operators access only to the information required to set the temperature and run the unit.

Ordering Information

Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, kg
FB-08	F949T	240	50/60	3000	76

The FB-08LT Fluidised bath

The FB-08LT Fluidised bath is a precision low temperature bath. It incorporates a cylindrical fluidised inner container, three term digital set point and indicator controller and two flowmeters for regulating the fluidised air and liquid nitrogen (LN2) supplies.

- Temperature range –100°C to 200°C
- Control stability, as good as ±0.2°C
- Working volume diameter x depth 165 x 385mm
- Built in drier for air supply
- Digital temperature indication
- Digital temperature set point

This model is specially designed for low temperature operation down to –100°C and is also capable of operating up to +200°C. The unit includes all of the special features listed for Model FB-08 fluidised bath. The method of operation is similar to Model FB-08 except that it has provision for connection to a LN2 supply and is fitted with an air drying system (mounted on the back of the unit). The air drier is required to prevent moisture in the fluidising air being introduced into the chilled fluidised bed thus preventing the alumina from fluidising. The LN2 supply is selected with a valve on the front of the unit. It is regulated by a flowmeter which controls the flow of nitrogen gas into the bath. The gas is exhausted from a connection on the rear of the unit and should be ducted to a well ventilated area.

At low temperatures the top opening of the bed should be completely closed, using the blanking plate provided, to avoid warm ambient air being drawn into the bed. The LN2 flows through a helical tube around the outside of the cylindrical stainless steel containing the fluidised bed. Temperature is controlled by a platinum resistance thermometer and is indicated on a large digital display. The entire system is completely self-contained. All that is required is a supply of liquid nitrogen and air, an electrical supply and you have a dry, safe calibration bath working down to –100°C with considerable precision. Sensors for calibration should be suspended as close as possible to the centre of the working area or, for increased uniformity placed in a probe holder.

Technical Information

	FB-08LT
Temperature range °C	–100 to +200
Temperature stability °C	
@ 200°C.	±0.2
@ –100°C	±0.5
Display resolution °C	1
Type of control	3 term (PID)
Sensor type	PT100
Heat up time, minutes 20°C to 200°C	30
Cooling time, minutes 200°C to –100°C	90
Air pressure, kPa (psi)	420 (60)
Maximum flow, litres/minute	170
Weight of medium, kg	16
LN2 consumption, maximum litres/hour	7
Overall size L x W x H, mm	770 x 615 x 600
Working volume Diameter x Depth, mm	165 x 385

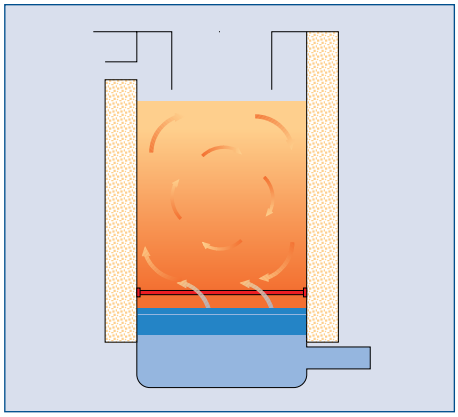
2204E Eurotherm FB-08LT Contoller

The Eurotherm is simple to operate and provides 3 term (PID) control functions. Digital set and readout of the bath temperature. Power is switched via solid state relay. Parameters within the microprocessor are factory pre-set to obtain the optimum performance from the fluidised bath.

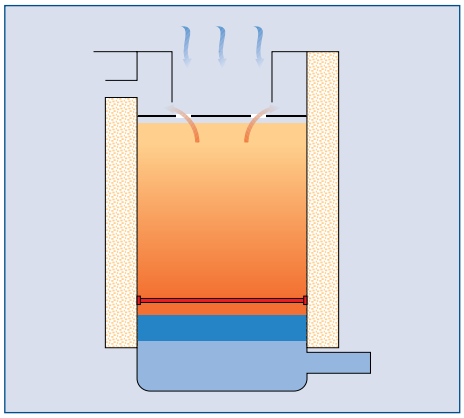
Ordering Information

Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, kg
FB-08LT	F949L	240	50/60	3000	82

FB-08LT



Circulation of aluminuim oxide promotes temperature uniformity.



Airbourne particles created by the the fluidised bed are drawn in to a peripheral extraction ring connected to a cyclone collector.

2204E

FB-08C

FB-08C, Fluidised Bath

The FB-08C has been designed to allow for calibration of thermal sensors over the temperature range 50°C to 700°C with minimum supervision and works in conjunction with a supervisory computer via an RS232 interface. Basic control programmes are set by the operator allowing for the control of set temperature, incremental temperature steps, dwell times and control of dead bed state.

- Temperature range 50°C to 700°C
- Temperature stability, as good as ±0.01°C
- Working volume diameter x depth 165 x 385mm
- PID temperature control
- Multiple set points and dwell times can be set by computer/programmable controller

This model is specially designed to allow the operating temperature of the fluidised bath to be adjusted from a remote source while the bath is unsupervised. An automatic fluidising air control system is fitted which adjusts the air flow rate accordingly to suit the set temperature of the bath.

This automatic air feature is controlled by a control system which switches five solenoid valves. These valves are opened and closed in various combinations, providing eighteen air flow rates corresponding to eighteen different temperatures throughout the operating range. Where an ultra stable temperature condition is required a "dead bed" state can be programmed into the control system. During this "dead bed" condition the air and electrical supply to the fluidised bed are switched off. For a period of up to 6 minutes the fluidised bed becomes an isothermal mass without heat input and very low heat loss. Under these conditions the stability at the centre of the aluminium oxide is ±0.01°C over the range of the unit.

A probe holder is available as an accessory (see page 42) that enhances the thermal conditions (control stability and uniformity) of the temperature zone within the baths (It is manufactured to special order to suit sensors under test).

The air flow to the fluidised thermal mass is automatically adjusted in order to maintain optimum isothermal conditions throughout the temperature range of the unit. Variable ramp rates of heating can be programmed with the Eurotherm 2408 controller or via a PC using the optional software package iTools.

Technical Information

	FB-08C
Temperature range °C	50 to 700
Temperature stability °C	
Dead bed	±0.01
Short term @ 50°C	±0.2
Long term @ 50°C.	±0.5
Short term @ 600°C	±0.3
Long term @ 600°C	±0.5
Display resolution °C	1
Type of Control	3 term (PID)
Sensor type	K Chromel/alumel thermocouple
Heat up time, minutes 20°C to 700°C	105
Cooling time, minutes 700°C to 200°C	165
Air pressure, kPa (psi)	420 (60)
Maximum flow, litres/minute	127
Weight of medium, kg	16
Overall size L x W x H, mm	870 x 515 x 600
Working volume Diameter x Depth, mm	165 x 385

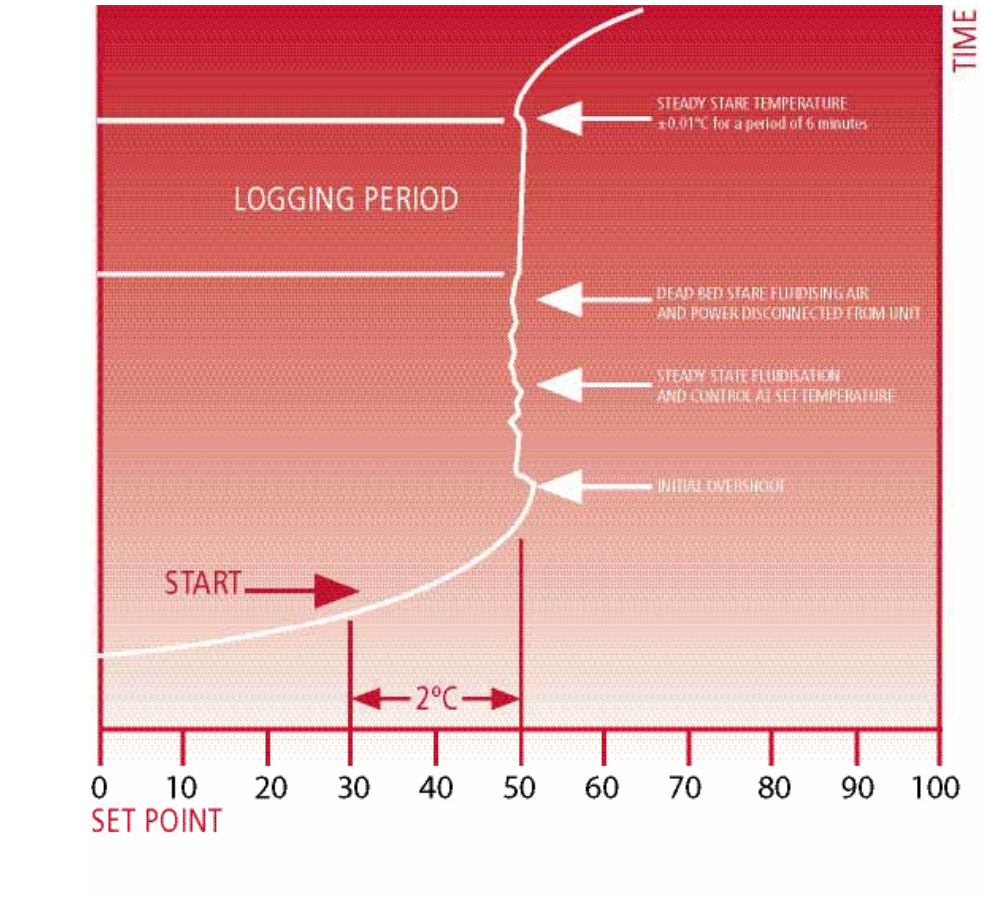
Ordering Information

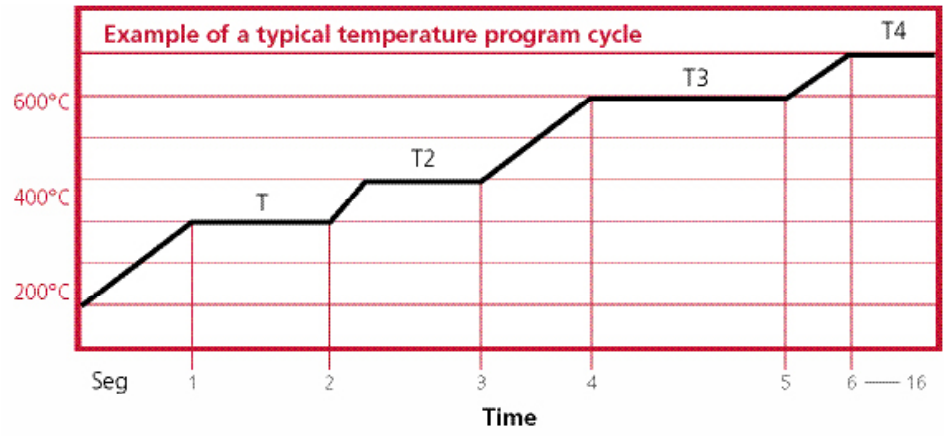
Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, kg
FB-08C	F949J	240	50/60	3000	84

2408, Eurotherm FB-08C Controller

The Eurotherm controller provides superb control by using a combination of a highly developed three term control supported by both self and adaptive control algorithms with dual PID. The adaptive tuning runs continuously in the background. It monitors the process and modifies the control if a disturbance takes the process outside preset limits. The 2408 controller accepts one program of 16 Segments.

FB-08C, 2408 Controller





Accessories for FB-08 range of fluidised baths

Basket/Probe Plate (FB-08 series only)

This combined Basket/Probe Plate accessory helps keep items being processed away from the heating elements of the bath and assists retrieval of items from the bath. The probe plate can be drilled by the customer to suit probes being calibrated and acts as a locator for the sensors in the bath.

Ordering Information

Product Code	Shipping weight, kg
F7759	2

Probe Carrier/Holder (FB-08 series only)

This specially designed probe holder is designed to allow free flow of the fluidising media around the exterior of the holder without creating dead areas. This thermal mass surrounds the sensors to be calibrated, assures constant uniformity, reducing short term temperature fluctuations and improves calibration accuracy. Custom probe holders can be supplied to suit specific diameters and lengths of probes being calibrated and the quantity of probes can be selected up to a maximum of eight per probe holder when ordering.

Ordering Information

Product Code	Shipping weight, kg
FFB08PR	12

Air Compressor (FB-08 and FB-08C)

Techne can supply a free standing moisture and oil free air compressor complete with the necessary filtration system for installations where a compressed air supply is not available.

Ordering Information

Product Code	Voltage	Hz	Watts	Shipping weight, kg
F120D	240	50	1500	36.5

Accessories for SBL range of fluidised baths

Overspill Flanges (SBL series only)

Fits into the top of the inner container of the fluidised bath, giving a wider area across the top of the bath opening. Any alundum that escapes from the fluidised bed is held on the flange and directed back into the bath. The flange is manufactured from aluminium with an anodized finish. (Supplied as standard with each unit).

Ordering Information

Product Code	Shipping weight, kg
F1133	3

Air Pressure Regulator/Filter (SBL series only)

Used in conjunction with air from a factory airline to regulate the supply pressure and quality of air to the fluidised bed. The unit removes oil and moisture from the supply air. Fitted with an automatic drain system.

Ordering Information

Product Code	Voltage	Hz	Watts	Shipping weight, kg
F5915			-	2

Air Compressor (SBL series only)

For use when a suitable air supply is not available. The compressor supplies an oil and moisture free air supply suitable for the SBL series of fluidised baths. Unit comes complete with inlet and oulet filters.

Ordering Information

Product Code	Voltage	Hz	Watts	Shipping weight, kg
F119D	240	50	400	18

Baskets (SBL series only)

Stainless steel baskets are available for each SBL model bath to keep workpieces from touching the heater elements and to make retrieval easier.

Ordering Information

Model Number	Product Code	Shipping weight, kg
Basket SBL-1	F7803	1.5
Basket SBL-2	F7804	2.5
Basket SBL-2D	F7805	2.6

BFS High temperature calbration bath

BFS high temperature calibration bath

- Temperature range 200°C to 1100°C
- Working volume diameter x depth 203 x 203mm

The BFS is designed for applications requiring a constant high temperature source for calibration. The BFS has a hinged lid and a cylindrical bath 218mm in diameter and 254mm deep. Substantial fire brick insulation is incorporated within the outer container and the lid.

Standard equipment includes a separate air supply control unit which incorporates two flowmeters for monitoring the air supply and a charge of fluidising medium (aluminium oxide) and air diffuser (zirconium oxide).

The inner container of the BFS is filled with two layers of fine granular particles. The lower layer (zirconium oxide) is denser than the upper layer (aluminium oxide) and does not fluidise but instead acts as a heat insulator. The inner container of the BFS is divided into inner and outer fluidised sections. Each area has a separate air supply which must be oil, water and dust free.

The air supply may be monitored on flowmeters in the air flow unit. Air supplies are adjustable to obtain uniform fluidisation in both sections of the bath. Heaters are mounted in firebrick insulation between the inner and outer container; heat is radiated inwards to the fluidised bath.

An air extraction tube is located in a horizontal position in the side of the bath just below the hinge on the lid. When the lid is closed, dust created by the bath's operation can be withdrawn by connection to an extraction duct or fan. The dust can also be trapped in a small tank of water.

TC-5 Temperature controller

TC-5 Temperature Controller

The TC-5 supplied with the BFS uses a chromel/alumel thermocouple, supplied as standard, which mounts onto the back of the BFS and fits into the pocket of the inner container. The TC-5 is fitted to the air flow control unit. The TC-5 uses an Eurotherm controller for setting the temperature in the fluidised bath and will control and indicate the bath temperature.

Advance PID controller giving set and actual bath temperature read out. Control algorithm gives stable 'straight line' control with self and adaptive tuning.

Technical Information

	BFS/TC-5
Temperature range °C	200 to 1100
Temperature stability °C	
Short term	±0.5 to 3.5
Display resolution °C	1
Type of control	3 term (PID) digital set, digital readout
Sensor type	K Chromel/alumel thermocouple
Air pressure, kPa (psi)	47 (7)
Maximum flow, litres/minute	85
For immersed object	
Maximum load size	2.2 litres
Maximum surface area	10400mm2
Weight of medium, kg	16 kg (aluminium oxide) 16.8kg (zirconium oxide)
Overall size L x W x H, mm	686 x 686 x 876 Airflow controller adds 305mm to width
Working volume	
Diameter x Depth, mm	203 x 203 Top lid has a central opening 82.5mm square

	TC-5
Overall size L x W x H, mm	430 x 305 x 140

Ordering Information

Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, kg
BFS Bath	F955B	240	50/60	6000	386

RCB-80 Ultra Low Temperature Liquid Bath

The RCB-80 is a mechanically-refrigerated bench top circulating bath that provides precise temperature control for a wide variety of applications and eliminates the cost and potential hazards associated with using dry ice or liquid nitrogen.
It offers a 4 liter bath capacity with an ultimate low temperature of -80°C. A built in magnetic stirrer, with variable speed control, provides excellent temperature uniformity and stability. A custom-fitted phenolic cover is standard with every unit when a probe holder is not ordered.

RCB-80
Ultra low temperature liquid bath

Features:

- -80°C ultimate low temperature
- 4 litre bath size
- Space-saving bench top design
- Built in magnetic stirrer
- RS-232 interface
- Low profile for easy bath access
- With optional probe holder is excellent for temperature sensor calibration
- Includes lid* and 2 gallons of bath fluid for -80 to 30°C operating range

(*the lid becomes part of the probe holder when it is ordered.)

Applications:

- Temperature sensor calibration
- Biological slide freezing
- Tissue freezing
- Pour-point determinations
- Charpy impact testing
- ASTM plastic and metal tests
- Viscosity studies
- Circulation source of controlled temperature liquids
- Controlled-temperature reactions

Technical Specifications

Heat Removal (Watts/BTUs)	+20°C	240/815
	0°C	220/750
	-20°C	170/580
	-40°C	150/510
	-60°C	110/375
Temperature Range°C	-80°C to 100°C	-80°C to 100°C
Stability	-40°C -80°C	+/-0.02 +/-0.04
Bath Volume	Litres	4
Cool down time to -80°C	Minutes	90
Chamber Dimensions		
Diameter x depth (mm) Display resolution	165 x 185 standard	6.50 x 7.25 0.1
Dimensions W x D x H (mm)	480x 610 x 330	19 x 24 x 13
Weight	kg	39
Electrical	230V/50Hz/5A	
	120V/60Hz/5A	
Warranty	1 year parts and labour	

RCB-80 Probe Holder

Accessory –FRCB80A Probe holder

The FRCB80A Probe holder contains five tubes for sensors with diameters (3/8" max) specified by the customer.

Ordering Information

Model Number		Product Code
RCB-80 Unit	230V 50hz	FRCB80D
RCB-80 Unit	120V 60hz	FRCB80P
Probe Holder		FRCB80A

Handheld Thermometers

4500 High Accuracy Smart Probe Thermometer

4500
High accuracy smart probe

The Model 4500 Series Ultra-High Accuracy Thermometer take metrology-level temperature measurement to the laboratory, the production floor and the field.

Ultra-high system accuracy, ±0.015°C , is achieved because the thermometer and probe function as if they were calibrated together as a system even though they can be purchased separately. The 4500 System uses coefficients stored in each probe with the Steinhart-Hart algorithm to calculate the exact temperature reading every time you plug in a probe to take a measurement.

The 4500 series thermometers accept a wide range of plug-in probes equipped with proprietary Smart Probe system. The probes utilize super stable thermistors capable of providing high resolution, fast response and ultra high accuracy.

System Features

- High system accuracy
- NIST traceable calibration included
- Interchangeable temperature probes
- Hand-held flexibility
- Hold reading button
- °C/°F display
- Auto shut off
- Three decimal place mode
- Delta T
- Function keys
- Min/Max reading
- RS-232 serial port

Applications

- Calibrate/verify your PCR Thermal Cycler
- Reference thermometer for your liquid bath
- Clinical laboratory quality control
- Chemical & petroleum regulatory/safety
- Metrology
- Thermal cycler plate uniformity
- Autoclave integrity

Technical Specification

Resolution:	0.01°C or 0.001° C selectable 0.001°C when using seral output
Display:	LCD 4 1/2 digit 0.6" high. Function icons.
Maximum Meter Range:	-40 to +150°C (-40 to +299°F)
Power:	9 volt Alkaline battery or external 12 VDC. Battery life 25 hours, typical; 15 with RS-232.
Reading Rate:	2 per second (update every 524 milliseconds)
Over Range Indication	Displays LO or HI
Operating conditions	Temperature 0°C to 45°C Humidity 0 to 85%

Ordering Information

Product Code	Model Number
FDB4400T	4500 High Accuracy Thermometer

Smart Probes Thermometer

Stainless Steel Tube Probe, for waterbaths, block calibrators & other general purpose use.
Designed for use with the 4500 Thermometer simply plug & play into the 4500 Thermometer.

Technical Specification

Sheath Size:	0.156"(5/32")dia. x 12.0"L
Temperature Range:	-40°C to +150°C
Accuracy*: 0 to 100°C±0.025°C	-25 to 125°C±0.05°C
	-40 to 150°C±0.15°C

*(accuracy specification includes 4500 thermometer)

Ordering Information

Product Code	Model Number	Temperature Range
FDBPR32	4500 5/32" Probe	-40°C to 150°C
FDBPR02	4500 0.2ml Probe	0°C to 100°C
FDBPR05	4500 0.5ml Probe	0°C to 100°C